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REVIEW ARTICLES

(1) " Antibacterial Agents derived from Micro-Organisms."

(2) " The Present Position of Phenothiazine as an Anthelmintic."

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ERRATA

Vol. **13**. p. 116. U.S.A. (1941). **New York State Department of Health.** For " 1,316 heads . . . not recorded," read " 1,316 examinations were made of 941 specimens. Negri bodies were found in 190 specimens." [Supplementary information received from the Department.]

p. 141. CLARK, H. C. (1942). For " In Central America . . . antibothsopic serum," read " In Central America . . . antibothropic serum."

p. 313. For " GRIFFITHS, S. D., (1942)," read " GRIFFITTS S.D. (1942)."

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

NOTE:—In certain cases it is not possible to check references in the original publication. Such references are marked with an asterisk.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 13.] October, 1943. [No. 10.

DISEASES CAUSED BY BACTERIA AND FUNGI

JACOB, M. M. (1941). Estreptococos da mastite bovina. I.—Identificação de estirpes isoladas em Inglaterra. **[Streptococci of Bovine Mastitis. I. Identification of Types Isolated in England].**—*Bol. pec., Lisboa.* **9.** No. 1. 35–61. [English and French summaries]. **2319**

J. studied 240 strains of streptococci obtained from the udders of 94 cows from different parts of England. He classified 140 (58%) as *Str. agalactiae*, 10 (4·16%) as *Str. pseudo-agalactiae*, 8 (3·75%) as *Str. dysgalactiae*, and 64 (26·8%) as *Str. uberis*. Of the remaining strains, 2·5% could not be identified and the rest were considered non-pathogenic forms of the groups *Str. bovis*, *Str. acidominimus*, and *Str. infrequens*.

He found all the strains of *Str. agalactiae* to be very uniform in character. They all fermented salicin and the majority were non-haemolytic on agar containing aesculin and crystal violet.

He classified as *Str. pseudo-agalactiae* (Plastridge & Hartsell) strains which resembled *Str. agalactiae* biochemically, but differed in their action on litmus milk and methylene-blue milk. Two strains in this group were serologically identical with Lancefield's group B. One strain was aesculin positive.

The *Str. dysgalactiae* strains had no action on sugars, aesculin, and sodium hippurate, but two strains acidified sorbitol and one mannitol. Among all the strains studied, *Str. dysgalactiae* produced least acidification of dextrose broth.

Of the strains of *Str. uberis*, 45·3% acted on inulin and 48·7% on sorbitol. The differentiation of *Str. uberis* from faecal strains is not always easy and the strains were not clearly defined biochemically.

None of the strains under study proved β-haemolytic. Haemolytic action was so variable as to place in doubt its value in classification and it was found impossible to distinguish the various groups from the colour of surface or deep cultures in the media referred to above.—MILLER WATSON.

I. MURPHY, J. M. (1943). **The Use of Strict Foremilk in the Study and Diagnosis of Chronic Bovine Mastitis.**—*Cornell Vet.* **33.** 48–51. **2320**

II. MURPHY, J. M. (1943). **The General Effect of Staphylococcal Infection on the Biochemical Composition of Strict Foremilk.**—*Ibid.* 52–56. **2321**

I. Experiments were designed to discover whether there were any bacteriological or chemical differences between samples taken at the different stages of milking. A series of four 10 ml. samples was taken aseptically from 50 quarters affected with mastitis, the milk itself being normal, as far as could be ascertained by visual inspection and microscopic examination. In addition, 276 pairs of fore-milk and end-milk samples, each of 20 ml., were examined and compared.

No difference was found in the type of organisms present in successively drawn 10 ml. samples of fore-milk or in fore-milk and end-milk from individual quarters. The number, however, of infecting bacteria and the degree of alteration in the chloride content, leucocyte content and pH value showed a general decrease from the first to the fourth sample of fore-milk.

A case is made out in favour of the use of strict fore-milk samples.

II. The leucocyte and chloride contents and pH of 4,049 samples from 120 cows of different ages were determined and compared with the bacteriological findings. Samples which contained less than 200 staphylococci per ml. conformed to the biochemical standards of normal milk. Samples containing a greater number often exceeded biochemical end-points in a manner similar to the "streptococcus-infected" samples.—N. S. BARRON.

VIERA, O., & CASTELO, M. (1942). Sobre investigación bacteriológica de carbunclo bacteridiano y sintomático en "materiales" enviados para diagnóstico. **[Bacteriological Diagnosis of Anthrax and Blackleg].**—*Bol. mens. Direcc. Ganad., Montevideo.* **26.** 149–153. **2322**

The authors stress that it is necessary to make cultures of material sent for laboratory diagnosis of anthrax and blackleg, suggesting that animal inoculation tests may fail to reveal infection demonstrable by culture tests.—MILLER WATSON.

—. (1942). Ley promulgada el 10 de setiembre de 1941 por la que se eleva al 75% el pago de indemnizaciones por tuberculosis bovina del ganado lechero y su decreto reglamentario de 20 de febbrero de 1942. **[Uruguay: Law of September 10th, 1941 Raising to 75% the Compensation Value of Milch Cows Condemned on account of TB., and the Decree of February 20th, 1942].**—*Bol. mens. Direcc. Ganad., Montevideo.* **26.** 56–63. **2323**

Under this law the tuberculin testing of all dairy cattle becomes compulsory in Uruguay. Reactors will be removed from herds and compensation paid to the extent of 75% of the animal's value. The owner may appeal on the valuation.

Testing will be carried out largely by the State service, but private testing by a veterinary surgeon will be recognized if carried out in conformity with government conditions.

The relative decree establishes official charges for the testing and gives details of the conditions under which private tests may be carried out.—M. WATSON.

MEYN, A., & MÜLLER, H. (1940). Die Bakteriologie der sogenannten isolierten Kehlgangslymphknotentuberkulose des Schweines. **[Bacteriology of the So-Called "Isolated TB." of the Lymph Nodes of the Throat in Swine].**—*Dtsch. tierärztl. Wschr.* **48.** 545–546. **2324**

Disease of the lymph nodes of the throat in pigs is uncommon in Germany, only 100 cases being found by the authors in 20,000 slaughtered pigs. These were investigated and *Corynebacterium equi* was isolated from 29 and tubercle bacilli from six, together with "micrococci" in every case.—J. E.

WOODRUFF, C. E., KELLY, R. G., & LEAMING, M. A. (1942). **Initial Tissue Response to Tubercle Bacilli.**—*Amer. Rev. Tuberc.* **46.** 319–328. [Spanish summary]. **2325**

The inoculum was composed of triturated virulent human tubercle bacilli, diluted in saline to a strength of 0·2 mg. of tubercle bacilli per ml. The dose given was 0·5 ml. intraperitoneally and the g. pigs were killed at varying periods of time after the injection.

Typical cell clumps appeared on the omentum from 15–30 min. after inoculation. From the cell counts of these lesions, the authors estimate that 89% are monocytes, 9% eosinophiles, and 2% lymphocytes, and suggest that phagocytosis and agglutination of the cells occurs before the true inflammatory response.

A comparison is also made between the inflammatory processes as they occur in the peritoneal cavity and in the pulmonary alveoli.—ANTHONY BUXTON.

GERSTL, B., & TENNANT, R. (1942). **Enzymes as Factors in Resistance to Tuberculosis.**—*Amer. Rev. Tuberc.* **46.** 600–611. [Spanish summary]. **2326**

In studies concerned with the part played by cellular enzymes in the interaction between the host and the invading tubercle bacillus, the enzymic actions of lung and kidney extracts from mice, rabbits, and g. pigs upon a phosphatide derived from the tubercle bacillus were investigated. [Phosphatide is the constituent of *Mycobacterium tuberculosis* which appears to be responsible for tubercle formation (see SABIN—*V. B.* **12.** 494).] The experiments reported indicated that phosphatide of the tubercle bacillus was broken down in the animal body by two enzymes, a lecithinase and a phosphatase, and that the action of the former prior to that of the latter was essential. But, while all the extracts exhibited a similar degree of activity against lecithin, their action on the phosphatide of the tubercle bacillus varied according to the tissue and species from which they were derived, the mouse extracts being the most active and the g. pig lung extract the least active. These differences in activity appeared to be related to variations in the susceptibility of the lecithinase in the extracts to the inhibitory action of fatty acids split off from the phosphatide of the tubercle bacillus.—J. L. MCGIRR.

RIORDAN, J. T. (1942). **Detection of Tubercle Bacillus Polysaccharides in Infected Material from Animals and Patients.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 168–170. **2327**

Using precipitin and collodion-particle agglutination tests, previously shown to be sensitive to the presence of tubercle bacillus polysaccharides in a dilution of $1 : 10^7$ [see RIORDAN—*V. B.* **13.** 45.], R. made an attempt to demonstrate the presence of polysaccharide in tuberculous tissues such as embryonic fluid from chick embryos inoculated with human type tubercle bacilli, and positive sputa from human patients. Only when the pathological material was subjected to agents which might artificially disintegrate the bacilli present, did the serological tests yield evidence of the presence of bacillary polysaccharide.—J. L. MCGIRR.

MEYN, A. (1940). Die "Ringbildung" als ein Kulturmerkmal der Geflügeltuberkelbakterien. **[Ring Formation as a Culture Characteristic of Avian Tubercle Bacilli].**—*Dtsch. tierärztl. Wschr.* **48.** 634–636. **2328**

Primary cultures of avian type tubercle bacilli on Petragnani's medium were observed to form moist glistening colonies which after a time assumed a ring form. These are illustrated, along with cultures of human and bovine type tubercle bacilli which did not form ring-shaped colonies.—J. E.

HOLLANDE, G., & BORIFAX, J. (1942). Origine et nature des formes cyanophiles (filaments et granules) du bacille tuberculeux. **[Origin of the Cyanophilic, Non-Acid-Fast Forms of Tubercle Bacilli].**—*C. R. Soc. Biol. Paris.* **136.** 501–503. **2329**

This is a study of the development of young tubercle bacilli on Sabouraud's glucose glycerin medium. From the 15th–48th hours of growth, the bacilli pass through a series of morphological and tinctorial fluctuations. At the 15th hour, cyanophilia of stained preparations begins with the appearance of intensely blue, relatively large granules in the bacilli (which at this stage are variably acid-fast), and develops to the stage of complete non-acid-fastness. At the 20th hour, there is a return to acid-fastness, with a definite shortening of the bacilli to an almost coccal form. A new cyanophilic phase, of variable duration, starts between the 21st and 23rd hours, accompanied by elongation of the bacilli and followed by fuchsinophilia. These changes may take place a third time and finally acid-fast bacilli, with all the characters of young tubercle bacilli, result in 48–72 hours.

Cyanophilia and fuchsinophilia may be present synchronously at different points of the same culture, depending on mass of growth, moisture and other factors. In young cultures, cyanophilia appears to be a regenerative process. In old cultures, it seems to result from enzymic disintegration of protoplasm.

—ISOBEL W. BURTON.

HENDERSON, H. J. (1942). **Comparison of Glycerol and Trehalose as Nutrients for the Growth of Tubercle Bacilli.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 67. **2330**

In view of the fact that the lipins of the tubercle bacillus are largely esters of trehalose, and not glycerides, the effect of substituting trehalose for the glycerol of Long's synthetic medium was investigated. The amount of bacterial growth on the trehalose medium was found to be considerably less than on the glycerol medium, the average bacterial dry weight of a fresh culture (strain A–21), after 58 days growth, being 1·580 g. per 200 ml. of the glycerol medium, and only 0·985 g. per 200 ml. of the trehalose medium.

—J. LOCHIEL MCGIRR.

POTTER, T. S. (1942). **The Death of Tubercle Bacilli Subjected to Oxygen Deprivation in the Presence of Moisture and of Warmth.**—*J. infect. Dis.* **71.** 220–224. **2331**

Six living cultures of bovine tubercle bacilli were incubated for at least two months in tubes which had been deprived of oxygen and sealed with glass, together with four similar cultures which were only cotton stoppered. At the end of these periods, each sealed culture was mixed in 30 ml. of phosphate solution and 0·5 ml. of this suspension was injected subcutaneously into each of ten g. pigs, and 1·0 ml. intravenously into each of four rabbits. None of the cultures produced infection, whereas the four cultures which were not glass sealed, when similarly treated and inoculated into g. pigs, did infect.

A similar experiment was also carried out with human tubercle bacilli, and the result was as before.

From these experiments, P. concludes that tubercle bacilli rigorously restricted from oxygen in the presence of moisture and incubated at 38° C., are gradually killed.—ANTHONY BUXTON.

FREEDLANDER, B. L. (1942). **Effect of Benzophenone and Allied Compounds on Human Tubercle Bacilli *in vitro*.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 153–156. **2332**

In an investigation into the bacteriostatic effect of benzophenone derivatives on human tubercle bacilli,

the diphenyl ketone itself and 26 derivatives were tested on a fast-growing avirulent Novy strain growing on a liquid synthetic asparagine medium. In view of the relative insolubility of many of the compounds used, they were, with a few exceptions, dissolved in propylene glycol as 1% solutions, subsequent dilutions being made directly into the media. The most active substances tested were 2, 4′-dichlorobenzophenone, and *o*- and *p*-chlorobenzophenone ; the former compound inhibited growth at a 1 : 100,000 dilution, and the two latter at 1 : 40,000. The sulphoxide and sulphone derivatives, including promin, were found to be low in bacteriostatic action, but no halogen or alkyl derivatives analogous to 2-4′-dichlorobenzophenone were tested. The latter compound inhibited the growth of a virulent human strain at a 1 : 60,000 dilution on a modified Sauton liquid medium, but exhibited no bacteriostatic action on Löwenstein's egg medium.—J. L. McGirr.

Smith, C. R. (1942). **Survival of Tubercle Bacilli. The Viability of Dried Tubercle Bacilli in Unfiltered Roomlight, in the Dark and in the Refrigerator.**—*Amer. Rev. Tuberc.* **45.** 334–345. [Spanish summary]. **2333**

Experiments were carried out to ascertain the viability of dried tubercle bacilli in unfiltered room light, in the dark, and in the refrigerator.

Suspensions of virulent human tubercle bacilli in water and sputum were spread on coverslips and allowed to dry. They were then exposed to daylight, but not direct sunlight, and were found to survive for four hours to five days. They were non-viable at 1–12 days.

In the dark, the viability of tubercle bacilli was from less than 40 days to five months, approximately, and in the refrigerator from 6½–14 months.

Further observations as a result of these experiments were that tubercle bacilli lived longer in smears made from sputum than from water and also that they lived longer in winter than in spring or summer.

The article contains details of procedure and technique together with summary tables of results.
—Anthony Buxton.

*Houthuis, M. J. J. (1941). Kort, voorloopig verslag van het paratuberculose-onderzoek over 1200 gevallen van chronische enteritis bij runderen gedurende de jaren 1936 tot en met 1939. **[Observations on Johne's Disease among 1,200 Cases of Enteritis in Cattle, seen between 1936 and 1939].**—*Tijdschr. Diergeneesk.* **68.** 853–866. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 150]. **2334**

Of 1,200 cattle with chronic enteritis, at Rotterdam abattoir, 1% were found on histological evidence to be affected with Johne's disease. Specimens from the surface of the ileo-caecal valve were found to be best for histological diagnosis. From the character of the lesions, H. considers it possible that recovery may take place in many cases, but he does not believe that the natural immunity of cattle can be raised by vaccination.
—Ann F. Russell.

Elrod, R. P., & Braun, A. C. (1942). **Pseudomonas aeruginosa ; its Role as a Plant Pathogen.**—*J. Bact.* **44.** 633–644. **2335**

Pseudomonas aeruginosa [*Ps. pyocyanea*] is a well recognized animal pathogen, and there are scattered references to its pathogenicity for plants. Two organisms, *Phytomonas polycolor* and *Phytomonas marginale*, are known to produce various types of soft rot in plants. The authors carried out agglutination, complement-fixation, and agglutinin-absorption experiments, and biochemical studies on various cultures of the above organisms and concluded that there was no essential difference between strains of *Ph. polycolor* and *Ph. marginale*, which are now considered to be identical, and *Ps. pyocyanea*. Authentic strains of the latter organism produced disease of tobacco plants, lettuce, potato, cucumber and onion.

It is pointed out that the ability of *Ps. pyocyanea* to thrive in plant tissues as well as in warm blooded animals makes it unique in the field of bacteriology.
—John Francis.

Mera, A. F. (1941). Un caso de infección a paratífico "A" en gato. **[Paratyphoid A in a Cat].**—*Rev. Med. vet., B. Aires.* **23.** 420–425. **2336**

Salmonella paratyphi A was isolated from the uterus of a cat with pyometra.—Miller Watson.

Haring, C. M. (1942). **Vaccination of Heifers and Calves to Control Brucella abortus Infection.**—*Proc. 6th Pacific Sci. Congr., 1939.* **5.** 293–297. **2337**

All heifer calves in a herd of 43 cows, 13 of which were shedding *Br. abortus* in the milk, were vaccinated when 5–8 months old with a live vaccine prepared from *Br. abortus* strain 19. Over a period of six years, the number of animals shedding *Br. abortus* in the milk fell from 13 to 1, while the number of cows in the herd increased from 43 to 68 without additions from outside.

In a herd free from brucellosis, efforts were made to detect any spread of the vaccine strain, 19, from vaccinated to unvaccinated animals. No such spread could be observed.—R. S. de Ropp.

van der Hoeden, J. (1942). **Epidemiology and Pathogenesis of Brucellosis-Bang.**—*Proc. 6th Pacific Sci. Congr., 1939.* **5.** 299–309. **2338**

The author gives a broad review of the literature on this subject. The different species of brucella appear to predominate in different parts of the world. The pathogenicity of porcine, caprine, and bovine strains varies for different animals. All three types may infect man. Almost all human infections originate from animals or animal products. Interhuman infection is exceedingly rare. The severity of the disease is much enhanced if the health of the animal is poor. In most cases the entry of brucella organisms into human beings causes a mild, subclinical disease. Infants are highly resistant to infection. Men appear to be more susceptible than women. The sudden appearance of strains of enhanced virulence for human beings has been noted.

The author finds that, in goats, horses, dogs, and g. pigs which are infected orally or through the conjunctival sac, brucella organisms localize in the lymph nodes of the throat and invade other organs from this point. In this way the organisms escape the destructive action of the gastric juices.—R. S. de Ropp.

Thomsen, A. (1943). **Does the Bull Spread Infectious Abortion in Cattle? Experimental Studies from 1936 to 1942.**—*J. comp. Path.* **53.** 199–211. **2339**

Four bulls excreting *Brucella abortus* in their semen were used for the service of 27 uninfected heifers. None of the heifers aborted. Of 19 that calved normally, none showed signs of placental infection. Eight failed to conceive.

Three bulls were used to serve a group of 22 heifers immediately after the bulls had copulated with a recently aborted cow which was excreting *Br. abortus* in the uterine discharge. None of the heifers aborted. Fourteen calved normally and the placenta showed no evidence of infection. Eight failed to conceive. Two proved to be already pregnant at the time when they were served.

Although experimental infection by copulation is feasible when the bull is artificially contaminated with massive doses of infective material, T. concludes that

this is not a mode of infection against which efforts need be directed for the prevention of the disease.
—R. S. DE ROPP.

KÖSER, A. (1940). Zur Serodiagnostik der Rinderbruzellose. **[Sero-Diagnosis of Bovine Brucellosis].** —*Dtsch. tierärztl. Wschr.* **48.** 631–634. **2340**

The agglutination test is the most reliable. K. recommends tests at three dilutions, *viz*, 1 : 30–40, 1 : 60–80, and 1 : 120–160. Where the result is doubtful, the Meinicke reaction should be made. The complement-fixation test is unnecessary.—J. E.

GALLO, P., & VOGELSANG, E. G. (1942). **First Investigations of Brucellosis in Venezuela.**—*Proc. 6th Pacific Sci. Congr., 1939.* **5.** 259–265. **2341**

Two strains isolated from aborting cows in Venezuela proved to be *Br. abortus*. Three cultures of caprine origin were *Br. melitensis*.—R. S. DE ROPP.

—. (1942). **Cultivation of *Brucella abortus* from the Blood.**—*Mon. Bull. emerg. publ. Hlth Lab. Serv., Lond.* Sept. pp. 8–9. **2342**

Br. abortus is difficult to recover from human blood as compared with *Br. melitensis*. Blood should be drawn in the evening when the temperature is highest and added in small quantities to glucose broth or serum broth, incubated in 10% CO_2 and subcultured at five-day intervals on to liver agar or serum agar ; 1 : 500,000 gentian violet may be added to the broth to inhibit staphylococci. Blood cultures should not be discarded as negative until one month has elapsed.—R. S. DE ROPP.

MCCULLOUGH, N. B., & DICK, L. A. (1942). **Physiological Studies of Brucella. I. Quantitative Accessory Growth Factor Requirement of Certain Strains of Brucella. II. Accessory Growth Factor Requirement of Recently Isolated Strains of Brucella abortus.**—*J. infect. Dis.* **71.** 193–197 & 198–200. **2343**

I. *Brucella abortus*, *Br. suis*, and *Br. melitensis* were grown on a synthetic medium made up of amino acids, glucose, and salts, with the addition of certain accessory factors. In the case of *Br. suis* and *Br. melitensis*, thiamine and nicotinic acid were both required to promote growth, 0·02 μg. per ml. being the lowest effective concentration of both substances. *Br. abortus* required thiamine and biotin, the lowest effective concentration of biotin being 0·0001 μg. per ml. Calcium pantothenate enhanced the growth of *Br. suis*, but was not essential.

II. Forty-one freshly isolated strains of *Br. abortus* were tested on synthetic media containing thiamine, nicotinic acid, calcium pantothenate and biotin in various combinations. Strains needing increased CO_2 tension failed to grow even in the presence of all four growth factors. Thirty of these strains would grow after acclimatization to atmospheric conditions. Twenty-three strains grew in the presence of thiamine and biotin alone.—R. S. DE ROPP.

QUORTRUP, E. R., & SUDHEIMER, R. L. (1943). **Detection of Botulinus Toxin in the Blood Stream of Wild Ducks.**—*J. Amer. vet. med. Ass.* **102.** 264–266. **2344**

The blood serum of ducks affected with western duck sickness was shown to contain botulinus toxin. 1 ml. (given intraperitoneally) of such serum was fatal to mice, whereas Type C botulinus antitoxin gave complete protection. When ducks were experimentally fed with 1 M.L.D. of Type C toxin, the mouse test detected it in their serum within 5 min., the peak being at ½–1 hour, and tests were positive for at least 68 hours after the ingestion of the toxin. The test is proposed as a method of diagnosis and typing, which obviates the necessity of culturing.—J. KEPPIE.

MADSEN, D. E. (1942). **Some Studies of Three Pathogenic Fungi Isolated from Animals.**—*Cornell Vet.* **32.** 383–389. **2345**

An *Actinomyces* was isolated from granulomas in the thorax of a dog, and a *Blastomyces* was recovered from similar lesions of another dog. A *Cryptococcus* was recovered from two g. pigs which had died after inoculation with material from purulent lymph nodes from a cow. A description is given of the morphological and cultural characteristics of these three organisms. The *Actinomyces* culture was found to be pathogenic for the rat, mouse, g. pig, dog and cat, while the other two were relatively avirulent.

There is a discussion of the probable classification of the three organisms, but no decisions are reached.
—M. H. KYAW.

BUENO, P., & FARIA, P. N. (1941). Rinosporidiose em muar. **[Rhinosporidiosis in a Mule].**—*Arq. Inst. Biol., S. Paulo.* **12.** 297–302. [English summary]. **2346**

A case of rhinosporidiosis is described in a mule. The animal was imported from Argentina and had had a recurrent polypoid growth inside the left nostril. The growth was removed and the causal organism identified as *Rhinosporidium seeberi*.

Illustrations of the growth and of the development of the parasite are given.—MILLER WATSON.

BERGNER, K. (1942). Mikrosporon equinum und Achorion gypseum als Erreger von Flechtenerkrankungen bei Pferden. **[*M. equinum* and *A. gypseum* as Causes of Ringworm in Horses].**—*Z. InfektKr. Haustiere.* **58.** 121–141. **2347**

In September, 1940, a skin infection broke out among army horses at a depot, affecting 292 out of about 1,200 animals. The number of infections decreased in the next month, and the outbreak died out in the middle of November. Microscopic examination of affected hairs indicated a fungal infection, and cultures obtained on honey or wort agar were recognized as *M. equinum*. Clinically, the infection could not be distinguished with certainty from *A. gypseum* infection, but the lesions were usually smaller, less pigmented, with thicker incrustations, and causing less inflammation of the underlying skin than in the latter infection. After recovery, the animals were immune to reinfection. One animal subsequently developed *A. gypseum* infection. Six cases of infection occurred among the horse attendants. Culture of the organism was obtained from stable dung. The organism was very resistant to disinfectants, and no effective treatment for the condition was found, infected animals recovering spontaneously after about 30 days.—J. G. CARR.

BRAUN, W. (1943). **A New Approach to the Problem of Bacterial Dissociation.**—*J. Bact.* **45.** 21–22. [Only abst. given]. **2348**

Brucella abortus was treated with ultra-violet light, urea and ribonuclease. It was found that U.V. radiation of 1,800–2,500 Å produced dissociation of smooth into rough colonies, but no change of R into intermediate or S type. S type colonies after suspension for 18 hours in 1% urea solution dissociated into the I type in 6–8% of cases and into the R type in 1% of cases. Urea produced no effect on R type colonies. 0·3, 0·15 and 0·07% ribonuclease had no effect either on S or R types of colonies.—R. S. DE ROPP.

KOGA, A. (1939). Ultraviolettmikroskopie bei Bakterien. (I. Mitteilung). **[Ultraviolet Microscopy of Bacteria. I].**—*Trans. Soc. path. japon.* **29.** 523–526. [In German]. **2349**

Living or fixed micro-organisms were photographed in ultra-violet light (2,800 Å) and compared

with stained preparations. Only a brief mention of some findings is given in the paper. Anthrax spores strongly absorbed ultra-violet light, but the vegetative forms did not. The sharply defined space between the rods seen in stained preparations was not seen in the ultra-violet photographs, the bacilli having stumpy ends set closely together. An internal structure was seen in *Bacillus anthracis, B. subtilis, Sarcina*, streptococci, and *Penicillium*. The deeply staining ends of colon and typhoid organisms strongly absorbed ultra-violet light, while the Babes-Ernst bodies of the diphtheria bacillus were only weakly absorbing, indicating that they are not composed of nucleic acid, as has been suggested. Strongly absorbing bodies were seen in staphylococci. It is pointed out that not only nucleic acid, but other materials such as cytochrome will cause this absorption of ultra-violet light.—J. G. Carr.

Delaunay, A. (1942). Recherche des constituants bactériens responsables de l'appel leucocytaire. **[Constituents of Bacteria which Attract Leucocytes].** —*Ann. Inst. Pasteur.* **68.** 72–74. **2350**

A new technique is designed to make determinations of this type available without the need for complicated apparatus or time-consuming methods. A modification of the Radsma-Hamburger method is used. Into a small tube with a bulb at the bottom with a mixing device (as in the Thoma-Zeiss haemocytometer) is placed 0·5 ml. saline, the tube is warmed to 37°C., and 20 cu. mm. of blood obtained from a finger-prick are measured in by a haemocytometer pipette. The tube is closed by a paraffined stopper and the contents gently mixed by rotating about a vertical axis. The bacteria or other material to be examined are added and mixed constantly by rotating, the tube being held at 37°C. for 20 min. The red cells are then lysed by adding 0·1 ml. 50% acetic acid and keeping at room temperature for 10 min., and the leucocytes are stained by bismark brown (0·5 ml. of 1% solution + 1% acetic acid) and examined wet by the microscope, or fixed with methyl alcohol, stained, mounted in glycerol, and examined dry.—J. G. Carr.

See also abstr. **2508**, **2516** (mastitis), **2383** (pneumococcus), **2558** (anthrax), **2439**, **2515**, **2544** (TB.), **2435** (Johne's disease), **2517** (*Haemophilus influenzae*), **2544** (brucella), **2505–2507**, **2518** (coliform bacteria), **2385–2387**, **2549**, **2550** (anaerobes), **2503**, **2504**, **2542** (antibacterial agents), **2432** (bacterial diseases of wild life in British Columbia), **2553** (ringworm).

DISEASES CAUSED BY PROTOZOAN PARASITES

Mazza, S., Miyara, S., Basso, G., & Basso, R. (1941). Primer quinquenio de la investigación por la M.E.P.R.A. de la enfermedad de Chagas en la Provincia de Mendoza. **[Report of First Five Years' Work of the *Misión de Estudios de Patología Regional Argentina* on Chagas' Disease in Mendoza Province, Argentina].** pp. 36. Mendoza: Imprenta Oficial. [8vo]. **2351**

Statistics are given of the number of human beings affected with Chagas' disease. The common vector was *Triatoma infestans* and many wild animals, as well as the majority of domestic animals, were found to be carriers of *Trypanosoma cruzi*.—Miller Watson.

Stein, L., & Wertheimer, E. (1942). **A New Fraction of a Cold-Susceptible Protein in Blood of Dogs Infected with Kala-Azar.**—*Ann. trop. Med. Parasit.* **36.** 17–27. **2352**

It was established that hyperproteinaemia is a regular feature of kala-azar in dogs as it is in human beings, and the nature of the various protein fractions present in the serum of affected dogs was investigated. It was noticed that a precipitation occurred when serum or plasma from dogs infected with kala-azar was kept in the refrigerator and that normal dog serum does not form a precipitate under the same conditions. Some properties of these specific cold-susceptible proteins of the euglobulin group are described. They are precipitated on cooling below 37°C. and dissolve on warming to 37°C. or to higher temperatures, but are irreversibly coagulated at 70°C.; one fraction of the cold-susceptible protein does not redissolve on warming. Two further groups of labile euglobulins which regularly occur in the blood of affected dogs are described; one is precipitated by 11% sodium sulphate and the other is precipitated by lowering the salt concentration by dilution. The serum of Syrian hamsters which were experimentally infected with *Leishmania donovani* did not show hyperproteinaemia and the total protein globulins and albumin were normal. This was probably because no stimulation of the reticulo-endothelial system was produced in the hamsters infected with the strain of *L. donovani* used in these experiments while in dogs, visceral leishmaniasis is accompanied by marked stimulation of the reticulo-endothelial cells.—R. A.

Russell, P. F., & Mohan, B. N. (1942). **The Immunization of Fowls against Mosquito-Borne *Plasmodium gallinaceum* by Injections of Serum and of Inactivated Homologous Sporozoites.**—*J. exp. Med.* **76.** 477–495. **2353**

Immunity in malaria depends on the combined interaction of cellular and humoral agencies. The present investigation was an attempt to immunize domestic fowls against mosquito-borne infections of *P. gallinaceum* by vaccination with inactivated homologous sporozoites (for humoral stimulation) and injection of serum from normal sheep (for cellular stimulation) and from fowls infected with the homologous *Plasmodium*, as well as by combinations of both sporozoite vaccine and serum. The results pointed to an interaction of both humoral and cellular agencies against malaria, as the series of birds so treated showed the greatest degree of immunity.—C. Horton Smith.

Lack, A. R., Jr. (1942). **The Occurrence of Intravascular Agglutinations in Avian Malaria.**—*Science.* **96.** 520–521. **2354**

A quartz rod micro-illuminator was used in the study of pathological changes in the circulation of eight canaries infected with *P. cathemerium*, and two normal birds. The rod was placed beneath the dorsal surface of the wing. As parasite numbers increased, progressive pathological changes were observed in the peripheral circulatory tree. The first changes noted included loss of "streamlining" of flow, retardation of flow rate, and temporary sticking of white blood cells to the endothelial lining of the venules. Plasma leakage and the spreading and rounding of fat cells followed these changes. As infection proceeded, white cells adhered to the endothelium in ever increasing numbers. Agglutination of red cells resulted from increased parasitization and first occurred in the venous stream. Intravascular clumping with formation of larger agglutinated masses followed in 24–48 hours, "streamlining" was completely disrupted, and the viscosity of the plasma increased. Clumps of red cells, first formed by parasitized red cells and later by both infected and normal red cells showed definite intrinsic cohesiveness. Clumps appeared to adhere to the phagocytes of spleen, liver, and bone marrow. White blood cells adhered to the

endothelium in layers, the thickened blood flowed sluggishly and thromboses became numerous. These changes in the circulatory system were soon followed by death.—C. Horton Smith.

Manwell, R. D. (1943). **The Low-Temperature Freezing of Malaria Parasites.**—*Amer. J. trop. Med.* **23.** 123–131. **2355**

The work was undertaken to test the practicability of the freezing method of maintenance of malaria parasites for use in the laboratory and to determine its effect on the different stages in the life-history of a number of species of malaria parasites. A description is given of the low temperature cabinet devised for the purpose. Ten species of parasite were used. M. succeeded in maintaining viable parasites (*P. nucleophilum*) for a maximum period of 212 days and he notes that *Trypanosoma lewisi* proved normally motile and able to infect rats when preserved in this way. Infections produced by plasmodia which had been kept in the frozen state were normal.—C. Horton Smith.

Johnson, D. W. (1942). **The Discovery of a Fifth Australian Type of Leptospirosis.**—*Med. J. Aust.* April 11th. 431–433. **2356**

Tentatively named *Leptospira mitis*, this new leptospira is distinct from those so far demonstrated in man in Australia—*L. australis* A and B, *L. icterohaemorrhagiae*, and *L. pomona*. It is also distinct from *L. canicola*, and probably from *L. autumnalis*, *L. grippo-typhosa*, the East Indian strains Palembang, Bangkinang, Baermann, and Batavia, and an Indian strain (Andaman).

Eight of the nine persons infected were associated with cattle or pigs. Agglutinins were demonstrated in cattle sera; pigs were not examined.

The organisms were seen in heparinized blood, and recovered by sowing blood into Schüffner's medium and by inoculating g. pigs intraperitoneally with urine. The g. pigs showed fever in about eight days, and P.M. examination revealed "signs characteristic of leptospirosis". Numerous leptospira were present in liver emulsion.—A. W. Banks.

See also absts. **2388**, **2520–2522** (trypanosomiasis), **2435**, **2523** (coccidiosis).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Casals, J. (1943). **Non-Virulent Frozen and Dried Antigens for Complement-Fixation Tests with Central Nervous System Virus Infections.**—*Science.* **97.** 337–338. **2357**

Standard virulent antigens were prepared by making up infected mouse brains into a 10% suspension in a mechanical homogenizer, centrifuging the material at 2,500 r.p.m. in a horizontal centrifuge, freezing and thawing and finally centrifuging at 5,000 r.p.m. in an angle-head centrifuge and discarding the sediment. A table is given showing that the effects of this treatment upon the complement-fixing antigen of Western equine encephalomyelitis virus were that the titre of antigens, irradiated or not by a mercury arc lamp, was the same and that satisfactory fixation of complement occurred. —J. C. Buxton.

Cohrs, P. (1940). Verschorfende, nicht blasenbildende Form der Maul- und Klauenseuche. **[A Scab-Forming, not Vesicle-Forming, Type of Foot and Mouth Disease].**—*Dtsch. tierärztl. Wschr.* **48.** 620–622. **2358**

During typical outbreaks of F. & M. disease, three cattle were seen in which two types of lesion occurred, *viz*, ordinary vesicles, and brown, leather-like scabs which were limited to the dorsum of the tongue. All the evidence, epidemiological, histological, and experimental (g. pig inoculation) indicated that the scabs had been produced by the specific virus.

Lesions of the rumen and omasum in F. & M. disease are also described. They were not the usual vesicles, but were blood-containing blisters, or scabs which resulted in erosion and perhaps perforation of omasum leaves.—J. E.

Carneiro, V. (1941). A doença de Aujeszky em suinos no Brasil, nos focos de epizootias em bovinos,—pela pesquisa de anticorpos neutralisantes do virus. **[Aujeszky's Disease in Cattle and Swine in Brazil].** —*Arq. Inst. Biol., S. Paulo.* **12.** 243–281. [English summary]. **2359**

Studying a number of outbreaks of Aujeszky's disease in cattle in the state of São Paulo, C. found that in practically every case the cattle were in contact with pigs. He examined sera of many pigs from these areas and found them to contain antibodies for the disease. The g. pig proved to be a suitable test animal for these investigations.

A neutralizing serum was obtained which was capable of protecting g. pigs against 250 M.L.D. when given intramuscularly in a dose of 0·05 ml. Antibodies were found in the serum of pigs kept apart from cattle and where no outbreak in cattle had occurred. C. concludes that swine act as carriers of the disease.—M. W.

Cabrera, M. (1942). Consideraciones sobre la rabia. Medios de profilaxis—Estado actual del problema. **[Rabies and its Control].**—*Gac. vet., B. Aires.* **4.** 139–143. **2360**

This is a review of known methods of prophylaxis against rabies and of the present position in Argentina. It is stated that since control and inoculation measures were introduced (many years ago) the incidence of the disease has decreased considerably. The collection and destruction of stray dogs has proved of great value. Statistics showing the position over a number of years are given.—Miller Watson.

Shope, R. E. (1940). **Swine Pox.**—*Arch. ges. Virusforsch.* **1.** 457–467. [In English]. **2361**

Experiments were undertaken first to study a North American strain of swine-pox virus more thoroughly, and second to learn whether this virus was a specific infective agent for swine or whether it was merely vaccinia virus in swine.

Swine-pox virus was collected as dried scabs from a benign outbreak of disease on a farm in Iowa and stored in 50% glycerol. It was administered to experimental pigs by means of skin scarification. Local pox lesions developed. Numerous secondary lesions occurred in the inguinal and axillary regions of pigs infested with lice (*Haemotopinus suis*), due to the carriage of virus from affected to non-affected areas. Pigs which had been infected by scarification showed no clinical symptoms as a rule, but a few which had received large doses of virus into the bloodstream exhibited high temperatures and a general malaise in about 13 days. The pathology of the disease is illustrated by photomicrographs of skin lesions in which there is a progressive densification of the area by lymphocytes and polymorphonuclear leucocytes. The virus was resistant and capable of storage over a long period. It consistently failed to infect rabbits by intratesticular injection. It was present in high concentration in the early skin lesions of pigs, as well as being demonstrable in dried scabs for a period of 16 days. One attack of

the disease rendered pigs solidly immune to reinfection, although their sera either failed to neutralize the virus or neutralized it in only very low titre. Pig lice were found to act as intermediate hosts for the virus.

To determine whether either vaccinia or swine-pox virus would induce an immunity to the heterologous virus, two pigs were infected with vaccinia virus and two with swine-pox virus. After recovery of the vaccinia-infected pigs, and beginning of regression of the swine-pox lesions, all four animals were inoculated with both vaccinia and swine-pox viruses. The two which had recovered from vaccinia virus developed swine pox only and the converse took place in pigs recovering from swine pox. It is suggested that there may be two distinct pox diseases of swine under field conditions, one caused by vaccinia virus and the other by swine pox.—J. C. Buxton.

Smadel, J. E., Rivers, T. M., & Hoagland, C. L. (1942). **Neucleoprotein Antigen of Vaccine Virus. I. A New Antigen from Elementary Bodies of Vaccinia.**—*Arch. Path.* **34.** 275–285. **2362**

In addition to the LS. and S. antigens already isolated by Craigie [see article in Doerr & Hallauer *Handbuch der Virusforschung*. p. 1118. (*V. B.* **10.** 419.)] from vaccinia virus, a new precipitating antigen has been obtained. It is a heat-stable nucleoprotein, and is found in alkaline extracts of purified elementary bodies. Antibodies against this factor have been demonstrated in the sera of animals immune to vaccinia.

—R. E. Glover.

Chambers, L. A., & Henle, W. (1943). **Studies on the Nature of the Virus of Influenza. I. The Dispersion of the Virus of Influenza A in Tissue Emulsions and in Extra-Embryonic Fluids of the Chick.**—*J. exp. Med.* **77.** 251–264. **2363**

Chambers, L. A., Henle, W., Lauffer, M. A., & Anderson, T. F. (1943). **Studies on the Nature of the Virus of Influenza. II. The Size of the Infectious Unit in Influenza A.**—*Ibid.* 265–276. **2364**

I. Filtrates of influenza A virus from mouse lungs and from the extra-embryonic fluids of infected chicks were centrifuged at 25,000 r.p.m. (gravitational force of 50,000 g.) for 30 min. The sediments and supernatant fluids were titrated in mice. In the case of the lung suspensions, sedimentation of the virus was nearly complete, whereas with the egg fluids a large part remained in suspension.

The authors suggest that the presence of a large proportion of normal cell components in a centrifugally sedimented concentrate of virus casts doubt on all measurements of the size of the infective unit. Thus, in infected mouse lung the particle appears to possess a size of about 100 mμ. diameter, but when it occurs in allantoic fluid it must be considerably smaller. A calculation is given showing that even if all the protein were virus [actually only about 2% is associated with influenzal activity (see II, below)], an infective dose could not contain more than 3–30 particles 100 mμ in size : in all probability the unit is nearer 10 mμ. It is also shown that particles from normal mouse lung can adsorb virus almost completely from egg fluids.

II. Preliminary studies indicate that influenza virus is one of the smallest infective agents so far isolated and is no more complicated than tobacco mosaic virus protein which consists largely of ribonucleoprotein.

Two fractions were obtained by differential centrifugation, *viz*, an homogeneous fraction showing a sedimentation constant $S_{20} = 20$ to 31×10^{-13} and a more heterodisperse fraction with a constant $S_{20} =$ about $800 \pm 100 \times 10^{-13}$. Both contained the virus in almost equal amounts per unit of protein weight. Electron micrographs indicated a spherical particle with a diameter of about 11 mμ.—R. E. Glover.

Söntgen, K. (1940). Die diagnostische Bedeutung der amtlichen Blutuntersuchung bei der ansteckenden Blutarmut der Einhufer. [**Diagnostic Importance of the Official Blood Test for Equine Infectious Anaemia**].—*Berl. Münch. tierärztl. Wschr.* April 26th. 193–195. **2365**

On the basis of haematological tests on 100 working horses in normal health, S. found that the criteria used in the German official blood examination test for E.I.A. are not valid as a true indication of its presence. Blood samples of many of the above normal horses which showed no clinically discernible sign of E.I.A. would have been classified as positive in the official test.

Mohler, J. R. (1943). **Report on Infectious Equine Encephalitis in the United States in 1942.** pp. 8. Washington, D.C. : Bureau of Animal Industry, U.S. Department of Agriculture. [4to]. **2366**

The disease was less prevalent in 1942 than in any year since 1936 and, although it occurred in 35 states, only 4,939 cases were reported from a total horse and mule population in affected areas of over 4½ million. One-fourth of all the recorded cases occurred in the state of Iowa.

The Eastern type of virus has been identified in 13 states and the Western in 18 states, while in 17 states from which disease has been reported, the type of virus has not been identified. In some instances, diagnosis rested solely on clinical and epizoological grounds and it is stressed that, unless the type of virus operating in all areas is frequently determined, such vaccination as is effected can be applied only on presumptive grounds. Every effort therefore should be made to carry out repeated virus determinations in state laboratories.

E.E. virus is capable of infecting many varieties of mammals and birds experimentally, but few natural infections have been identified except in equine animals and man, and veterinarians should continue to be on the alert for clinical signs of the disease in other animals, particularly in species which could act as reservoirs.

Very large quantities of chick-embryo vaccine have been used throughout the U.S.A. and results on the whole have been good ; all available evidence points to the necessity of giving two successive doses of vaccine for maximum protection. The disease now seems to be enzootic in 45 states.

It is impossible to predict how extensive the disease will be in future years, in spite of the fact that almost half of the equine population of the country has now been vaccinated. Even if vaccination were practised on a much wider scale, the disease could not be eradicated by this means alone, for there will always be susceptible animals and the virus will persist in nature until animal reservoirs are eliminated or controlled.

—J. C. Buxton.

Bang, F. B. (1943). **The Course of Experimental Infection of the Chick Embryo with the Virus of Equine Encephalomyelitis.**—*J. exp. Med.* **77.** 337–344. **2367**

Both Eastern and Western strains of E.E. virus which had been carried by monthly passages through g. pigs by intracranial inoculation for a number of years were used for this work, and glycerinated suspensions of brains diluted in saline to 1 : 20 were inoculated on to the chorio-allantoic membranes of hens' eggs and incubated. Results were usually complete in 36–48 hours. Virus multiplication proceeded rapidly until the embryo was destroyed, when it ceased abruptly. It was not possible to demonstrate any selective tissue

destruction, but large amounts of virus were obtainable from all parts of the egg. Both the chorio-allantoic membrane and the hatched chick showed a resistance to Eastern and Western viruses which increased with age.—J. C. Buxton.

Bang, F. B., & Herriott, R. M. (1943). **Purification of Equine Encephalomyelitis Virus by Ultracentrifugation and Maintenance of Its Activity with Cysteine.**—*Proc. Soc. exp. Biol., N.Y.* **52.**, 177–180. **2368**

Experiments to separate virus from non-virus material consisted in ultracentrifugation, fractional precipitation by dialysis or dilution, and fractional precipitation by heparin. The first method proved to be the most effective. Results given in table form show that the virus can be thrown down by ultracentrifugation and recovered by resuspension in buffered saline solution. The addition of cysteine preserved the activity of the virus to a marked extent.—J. C. Buxton.

Kubes, V., & Diamante, A. (1942). Estudios de inmunidad cruzada entre el virus de la encefalomielitis equina de Venezuela y los virus encefalomielíticos norteamericanos este y oeste y el argentino. **[Cross-Immunity Studies between Venezuelan Equine Encephalomyelitis Virus and the Eastern and Western United States and the Argentine Viruses].**—*Bol. Inst. Invest. vet., Caracas.* **1.** No. 2. pp. 49–79. [English summary]. **2369**

The authors carried out a large number of cross-immunity tests with Venezuelan, Argentine, and the two N. American strains of E.E. viruses. Detailed descriptions of the methods used are given and the conclusions may be summarized as follows. (1) Chick embryo vaccine of the Venezuelan virus protected animals against large intracranial doses of homologous virus. (2) Hyperimmune serum (obtained from an ass) did not protect against subsequent infection and merely delayed the death of the animal to some extent. (3) In carrying out serum-neutralization tests the intracranial inoculation route proved more accurate than the peritoneal. (4) Vaccines prepared from Argentine and from Eastern and Western types of virus did not provide immunity against the Venezuelan strain, and Venezuelan vaccine did not protect against the other strains. There was, however, some slight resistance to infection by heterologous virus as shown by delayed death. (5) This slight resistance is called para-immunity by the authors and was found to exist in relation to Venezuelan E.E. and rabies virus. (6) The authors conclude that the Venezuelan virus is a distinct type, immunologically different from the others.—Miller Watson.

Rosenbusch, F. (1941). Encefalo-mielitis equina. Experiencias de inmunización. **[Immunization against Equine Encephalomyelitis].** pp. 38. Buenos Aires: Asociación Medico Veterinaria Argentina. [8vo]. **2370**

R. reviews present knowledge of the subject and gives a short account of some experiments in immunity. Routine inoculation with chick-embryo vaccine against E.E. provides useful control of the disease, the immunity lasting for at least one year. Trials have been made with combined live virus and immune serum injections and the results are promising. R. found that some animals thus treated maintained immunity for a number of years and he considers that they may have acquired life-long immunity. Much work still remains to be done with this type of inoculation before definite conclusions can be drawn.—Miller Watson.

Schönborn. (1940). Nachtrag zu einer Veröffentlichung "Die Schweinepest im Regierungsbezirk Minden". **[Supplement to the Article "Swine Fever in the Minden District"].**—*Berl. Münch. tierärztl. Wschr.* May 24th. 247–248. [For previous article, see *V. B.* **11.** 858]. **2371**

In a note to clarify remarks in the article referred to, S. here states the risk of using live S.F. virus in immunization and suggests that its use should be prohibited. [This was done soon afterwards by the authorities.]—J. E.

Bueno, P. (1941). O diagnostico histologico da peste suina con referencia especial ás alterações pulmonares. **[Histological Diagnosis of Swine Fever with Special Reference to Lung Changes].**—*Arq. Inst. Biol., S. Paulo.* **12.** 283–296. [English summary]. **2372**

B. examined the lungs of a large number of animals with S.F. He believes that the pneumonia of S.F. can be distinguished from that of *grippe* (swine influenza), and can play a useful part in diagnosis.

In the early stages of S.F. pneumonia, he found hyperaemia, haemorrhages, oedema, and infarcts. Inflammatory infiltration only shows to a lesser degree, but there is desquamation of the alveolar and bronchial epithelium. At later stages there is infiltration of the alveolar and bronchial tissues by histiocytes, and in chronic cases there is considerable proliferation of connective tissue.—Miller Watson.

Siedentopf, H. A., & Green, R. G. (1942). **Factors in the Preservation of the Distemper Virus.**—*J. infect. Dis.* **71.** 253–259. **2373**

The distemper virus used was a spleen virus obtained from 12 infected ferrets killed on the third or fourth day following the evidence of fever, the spleens being homogenized and diluted to a 25% suspension. The virus was then frozen at 24°C.

After 216 days, the virus was thawed at room temperature, diluted with distilled water, and a small dose injected into a ferret. The ferret developed typical distemper and was killed on the tenth day. Ferrets were similarly tested with the spleen virus kept at −24°C. for 330 days or 693 days, and in each case it was found to retain most of its original virulence.

The effect of exposure to sunlight was ascertained by taking three samples of ferret spleen virus, thawing them at room temperature, and then exposing to sunlight for 45 min., 2 hours, and 7½ hours respectively. Animals, subsequently inoculated with these three samples, developed typical distemper and died in 11–13 days after inoculation.

It was also found that spleen virus diluted with sterile normal horse serum and dried from the frozen state *in vacuo* following quick freezing with CO_2 ice, would remain viable for more than a year when sealed in the original vacuum and stored at 70°C.

Other points made by the authors are that quick freezing is not essential to the preservation of the virus, that some factor other than moisture has a deleterious effect upon the modified distemper virus, and that storage in oxygen-free dry nitrogen maintains the viability of the virus for a year.—Anthony Buxton.

Barton, J. C., & Green, R. G. (1943). **Histologic Adaptation of the Virus of Fox Encephalitis.**—*Amer. J. Hyg.* **37.** 21–36. **2374**

A detailed study of the distribution of inclusion bodies was made in naturally acquired fox encephalitis, and following inoculation of virus *via* the cisterna magna. In the naturally infected foxes, 91% of all inclusions were in vascular endothelial cells, and 98% of these were in cerebral endothelium. The nerve cells were not directly involved. In the natural disease the inclusions, in order of their frequency, were found in cerebrovascular endothelium, pia-arachnoidal cells, hepatic cells, and endothelial cells of the liver and

kidney. In the experimental foxes there was an increase in the number of inclusions in the pia-arachnoid and hepatic cells, and inclusions were also found in the ependymal cells. The number in the brain itself, particularly in the cerebral hemispheres, was smaller. There was little difference in the total number of inclusion bodies, but in the experimental infection there was a definite change from a cerebral to a more meningeal and visceral type of disease.—JOHN FRANCIS.

MELNICK, J. L. (1943). **The Ultracentrifuge as an Aid in the Detection of Poliomyelitis Virus.**—*J. exp. Med.* **77.** 195–204. **2375**

Most of the older methods used for the detection of poliomyelitis virus are not sufficiently sensitive. A method involving the separation of virus from contaminating material in faecal suspensions by differential ultracentrifugation was evolved, the final product being inoculated intracerebrally (method 1). The efficiency of this method was compared with that of the intra-abdominal injection of etherized faecal suspension in conjunction with the intranasal instillation of the untreated faecal suspension (method 2). When the two methods were compared on 11 faecal samples, the disease developed in ten monkeys out of 11 inoculated with material prepared by method 1, but in only two of 11 when method 2 was used.

From one titration experiment it appeared that method 1 was at least 100 times more sensitive than method 2.—JOHN FRANCIS.

HORSFALL, F. L., Jr., CURNEN, E. C., MIRICK, G. S., THOMAS, L., & ZIEGLER, J. E., Jr. (1943). **A Virus Recovered from Patients with Primary Atypical Pneumonia.**—*Science.* **97.** 289–291. **2376**

Specimens from human patients were inoculated into different animal species by numerous routes. In no instance were obvious signs of infection produced, but it was discovered that animals inoculated with some specimens or with passage material from them developed antibodies capable of neutralizing a heterologous virus known as P.V.M. (the pneumonia virus of mice). The presence of minor common antigens is suggested.
—J. C. BUXTON.

WHITMAN, L. (1943). **A Modified Intraperitoneal Protection Test for Yellow Fever Based on the Greater Susceptibility of Immature White Mice to the Extraneural Injection of Yellow Fever Virus.**—*Amer. J. trop. Med.* **23.** 17–36. **2377**

One of the disadvantages of current mouse tests for determining the yellow fever antibody content of human sera is the need to use fairly large doses of serum for the intraperitoneal method of assay and the occasional occurrence of serum samples which are toxic by the intracerebral route. W. shows that mice, 18–21 days of age, are very uniformly susceptible to intraperitoneal injection of virus, death being induced by 1/10th of the dose required for adult mice. The new test is of value in detecting very small quantities of antibody, since it is possible to increase the proportion of immune serum in the test.—R. E. GLOVER.

DOUGLAS, J. R. (1940). **The Knowledge of the Internal Anatomy of *Dermacentor Andersoni* Necessary to Pursue the Study of Rickettsial Infections in the Tick.**—*Proc. 6th Pacific Sci. Congr. 1939.* **4.** 487–497. **2378**

D. describes those features of the anatomy of *D. andersoni* which may be of value in identifying and studying the distribution of pathogenic rickettsiae, such as that of Rocky Mountain spotted fever, in the tissues of the tick.—E. S.

IMMUNITY

TEORELL, T. (1943). **A Quantitative Theory of the Precipitin Reaction. [Correspondenee].**—*Nature, Lond.* **151.** 696–697. **2379**

The proposed theory is based on the same fundamental ideas as those recently employed by several authors [*e.g.* PAULING—*V. B.* **12.** 30]. The mathematical treatment, however, is more simple, and the results are held to possess a more general significance. The principle applied is similar to that governing the dissociation of a weakly polybasic acid of the type H_NX, namely, that of "step dissociation". The antibody A (corresponding to the hydrogen H) is assumed to be univalent, and to combine in steps with the polyvalent antigen G (corresponding to the N-valent X ion of the acid) to form compounds AG, A_2G . . . to A_NG. Equations are derived, on the basis of the mass-action law, whereby a complete solution for the unknown quantities $[A_NG]$ . . . [AG], [A], and [G] is obtained in terms of the known mixed quantities of antigen and antibody, and the known dissociation constants k_1, k_2 . . . k_N. A graphical representation of some consequences of the theory is given in diagrammatic form. The theoretical results derived from application of the theory appear to be in good agreement with the experimental facts.—J. LOCHIEL MCGIRR.

HOLFORD, F. E., LUDDEN, J. B., & STEVENS, W. H. (1943). **Antibody Response to Hemoglobin Adsorbed on Aluminium Hydroxide.**—*J. Immunol.* **46.** 47–58. **2380**

Human, sheep, rabbit, dog, and g. pig haemoglobins were found to be adsorbed by aluminium hydroxide, the degree of adsorption being conditioned chiefly by the relative proportions in which the haemoglobin and aluminium hydroxide were mixed and, secondarily, by the pH and the character of the adsorbent. The antibody response in rabbits to such adsorbed human haemoglobin administered in a series of small intra-abdominal injections was considerably better than that to a human haemoglobin solution administered intravenously. The value, for antibody formation, of repeated antigenic stimulus was apparent throughout the study, being increasingly evident with progressive reduction in the amount of antigen used.
—J. LOCHIEL MCGIRR.

KOSSOVITCH, N., & CANAT, J. (1942). Microméthode simple pour l'étude du pouvoir phagocytaire des leucocytes. **[Simple Micromethod for the Study of the Phagocytic Power of Leucocytes].**—*Ann. Inst. Pasteur.* **68.** 69–71. **2381**

The antigenic polysaccharides of *Salmonella typhi, S. paratyphi* B, *Bacterium coli, Bact. flexneri,* and *Bact. shigae* will repel leucocytes when injected in large doses, but when diluted aquire the ability to attract them at an optimal dilution.—J. G. CARR.

GOLDIE, H., PARSONS, C. H., & BOWERS, M. S. (1942). **Titration of Tetanal Toxins, Toxoids and Antitoxins with the Flocculative Test.**—*J. infect. Dis.* **71.** 212–219. **2382**

A paper of interest to those concerned with the laboratory assay of tetanus toxin, toxoid, and antitoxin. Details are given of how secondary precipitation can be avoided. A standard tetanus antitoxin giving only a simple and specific flocculation zone was obtained by selecting, diluting, blending, and heating certain refined (enzyme-digested) antitoxins. A large number of tetanus toxins and toxoids were titrated both by the flocculation test and by *in vivo* methods,

and it was shown that Lf values were as accurate an indication of potency, antigenicity, and immunizing activity as in similar accepted work with diphtheria antigens. Many parallel tests of Lf and L+ values are given, and atypical results are included. The technique is described by which the flocculation test can be used for the determination of antitoxin values at various levels down to 0·25 unit per ml. The effect of certain culture media in producing nonspecific precipitation is discussed.—J. KEPPIE.

MILLS, C. A., & SCHMIDT, L. H. (1942). **Environmental Temperatures and Resistance to Infection.**—*Amer. J. trop. Med.* **22.** 655–660. **2383**

Pneumococcal infection in mice was used to investigate the cause of the recognizably lowered resistance to infection shown by man and animals when exposed to relatively high temperatures.

Mice adapted for three weeks to a temperature of 91°F. and 60–70% humidity were contrasted with a similar large number kept at 68°F. within that range of humidity. Results showed that depressive warmth lowered resistance to infection, whereas a cool environment had a stimulating effect. Other experiments showed that the difference in survival time between the respective groups could not be accounted for in terms of antibody response. Studies now in progress point to a reduction in phagocytic activity as the dominant factor in the lowered resistance caused by environmental warmth.—J. KEPPIE.

MILLS, C. A. (1942). **Infection Frequency and Host Resistance as Influenced by Climate and the Weather.**—*Proc. 6th Pacific Sci. Congr., 1939.* **5.** 473–492. **2384**

Large numbers of statistics on the morbidity and mortality rates from TB., acute respiratory infections, acute appendicitis, and nephritis are collected and correlated with atmospheric conditions.

It is shown that tropical climates, with the consequent difficulty of body-heat loss, produce retarded physical development and lowered resistance to infection, as contrasted with the much more vigorous existence and heightened resistance to infection enjoyed by people of cooler countries where the "climatic stimulation" is much greater.

Another important climatic factor which requires more accurate analysis is the effect of weather change. The passage over human populations of major storm disturbances, whether by temperate zone storms or tropical typhoons seems to bring a heightened incidence of acute infections, particularly of the respiratory system; it also precipitates the onset of acute appendicitis and the onset of clinical symptoms in tuberculous patients. This storm effect occurs equally well among temperate zone people of high tissue resistance and among the more susceptible individuals living under a blanket of depressing tropical heat. [It is not emphasized in this article, but extreme cold also has a depressing influence on growth rate and resistance to infection.]

Preliminary evidence confirming some of the above conclusions is being obtained with experimental mice.—JOHN FRANCIS.

I. MCCLEAN, D., ROGERS, H. J., WILLIAMS, B. W., & HALE, C. W. (1943). **Early Diagnosis of Wound Infection. With Special Reference to Gas-Gangrene.**—*Lancet.* **244.** 355–360. **2385**

II. MCCLEAN, D., & ROGERS, H. J. (1943). **Early Diagnosis of Wound Infection, with special Reference to Mixed Infections.**—*Ibid.* 707–708. **2386**

I. Because it is so difficult in the treatment of wounds, even with considerable experience, to establish the presence of an anaerobic infection in the early stages, the possibility was investigated of detecting the presence of actively proliferating pathogenic organisms, by means of the enzymes which they produce in the infected muscle or wound exudate, at a stage when the infection cannot be recognized by clinical or ordinary bacteriological examination. It has been known for some time that organisms of the gas-gangrene group, staphylococci, streptococci, and pneumonia organisms, produce in addition to their recognized toxins, enzymes (hyaluronidases) which increase the permeability of the tissues [see also *V. B.* **12.** 157]. MACFARLANE & KNIGHT [see *V. B.* **12.** 335.] have also demonstrated that *Clostridium welchii* produces an enzyme "lecithinase" which hydrolyses lecithin.

Investigations were carried out on g. pigs infected intramuscularly with washed 18-hour cultures of several strains of *Cl. welchii*, *Cl. septicum*, and *Cl. oedematiens*. The results showed that if the infecting strain, no matter which species, produced hyaluronidase, the enzyme could be detected in the oedema fluid as soon as the infection was sufficiently advanced to produce enough fluid for examination. In the experiments with *Cl. welchii* infection, lecithinase could also be detected in the oedema fluid very soon after production of fluid; in the *Cl. oedematiens* experiments, lecithinase was detectable only in small quantities in the muscle at a very late stage in the infection, and it is thought that the presence of this enzyme in such low potency is unlikely to be of diagnostic significance in the tissue fluids.

Investigation of the hyaluronidase production of gas-gangrene-producing organisms indicated that a large proportion of *Cl. welchii* strains produce hyaluronidase; all the strains of *Cl. septicum* examined produce this enzyme but, while half the strains of *Cl. oedematiens* examined produce the enzyme, there is no evidence that this property is correlated with the incidence of gas-gangrene due to this organism.

Methods for the detection of hyaluronidase and lecithinase which can be used both in the laboratory and in the field are described, together with simple methods of diagnosing the bacterial source of the enzymes by means of specific neutralization tests with antisera.

II. Investigations were made on the effects produced by mixed infections, *i.e.* infections produced by either *Cl. welchii* or *Cl. oedematiens* together with staphylococci or streptococci which produce hyaluronidases. Observations indicated that the presence of a hyaluronidase-producing aerobe in a wound, together with a non-hyaluronidase-producing member of the gas-gangrene group, may profoundly modify the character of the infection produced by the latter organism, and although the infection may have the clinical character of gas-gangrene, the hyaluronidase present in the exudate will be derived from the accompanying aerobe: also if both organisms present produce hyaluronidase, then the enzyme from both bacterial species will be present in the wound exudate. For this reason it is recommended that polyvalent anti-hyaluronidase sera containing anti-hyaluronidase to *Cl. welchii*, *Cl. septicum*, staphylococci, and streptococcus groups A and C, should be used instead of the monovalent sera previously recommended [see I] for use in determining the bacterial source of enzymes in wound exudates.—R. ALLCROFT.

LYTHGOE, B., & MADINAVEITIA, J. (1943). **Studies on Diffusing Factors. 10. Note on the Formation of Viscous Materials by *Clostridium butylicum*.**—*Biochem. J.* **37.** 6–9. [For previous parts, see *V. B.* **12.** 156]. **2387**

It was noticed that *Cl. butylicum* produced viscous materials when grown in a relatively simple glucose-

asparagine-mineral salts medium containing bacto-peptone as a source of biotin. Some of the factors affecting the production of these viscous materials were investigated. No evidence was obtained for the presence of glucosamine in the viscous material, nor was the viscosity destroyed by hyaluronidase, but the growth of *Cl. butylicum* and the formation of viscous material were both inhibited in the presence of purified hyaluronidase preparations.—R. ALLCROFT.

See also absts. **2326** (immunity to TB.), **2419**, **2420** (to trichinosis), **2337** (immunization against brucellosis), **2353** (against avian malaria), **2370** (against equine encephalomyelitis), **2357** (complement-fixation tests for viruses), **2416-2418** (for trichinosis), **2407** (precipitin tests with cestodes), **2362** (vaccinia antigens), **2350** (bacterial constituents attractive to leucocytes).

PARASITES IN RELATION TO DISEASE [GENERAL]

*PEREIRA, C., & ALMEIDA, W. F. (1941). Observaçoes sobre parasitologia huamana e veterinaria em Matto Grosso. **[Parasites of Man and Animals in Matto Grosso, Brazil].**—*Mem. Inst. Osw. Cruz.* **36.** 301–309. [Abst. from abst. in *Biol. Abstr.* Sect. F. **16.** No. 8. 40]. **2388**

The authors claim that *Trypanosoma equimum* only acts as an accessory debilitating factor in *mal de caderas*. They believe that the disease is really caused by a combination of malnutrition, over-work, and loss of blood caused by tabanids and bots.

"Black scour" in calves is said to be caused by pure infestation with *Strongyloides papillosus*, whereas previously it has been considered that mixed infestations were responsible.—H. D. CROFTON.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

I. MACLEOD, J. (1943). **A Survey of British Sheep Blowflies.**—*Bull. ent. Res.* **34.** 65–88. **2389**

II. MACLEOD, J. (1943). **A Survey of British Sheep Blowflies. II. Relation of Strike to Host and Edaphic Factors.**—*Ibid.* 95–111. **2390**

I. The survey is based on 1,386 samples of larvae collected during 1934–1941 from cases of blowfly strike. Flies were bred out and identified from 1,307 of the samples. For purposes of the survey the British Isles were divided into 16 regions and the account includes a brief description of each zone, along with an analysis of the relative abundance of the flies causing sheep myiasis. At least six species of flies may cause strike, although in all regions *Lucilia sericata* is the dominant species, accounting for 96·4% of all records considered both in this survey and by previous investigators.

The incidence of strike due to species other than *L. sericata* decreases in passing from the north-west towards the south-east of Britain; 47% of such cases were recorded in the region north and west of a line from Inverness to Glasgow. These alternative species in order of importance as myiasis-producing agents are *Lucilia caesar* (including *L. illustris*), *Phormia terraenovae*, and the two species of *Calliphora*. Larvae of *Muscina* spp. were recorded in only three samples. *L. caesar* and *P. terraenovae* occur most commonly in cases of strike during the first half of the blowfly season.

II. The information in part II is based on 1,032 samples of larvae collected during 1938–41 from cases of blowfly strike. The earliest and latest seasonal dates on which samples of larvae were received were May 4th and October 24th respectively, both in 1938, although a strike was recorded as early in the year as April 27th in 1940, in an experimental flock. The incidence curve of strike has a diphasic character due to the reduction in number of strikes immediately following shearing. There are four phases in the incidence of strike. (1) The pre-shearing phase dominated by ewe strikes. (2) The shearing trough with only occasional lamb strikes. (3) A period dominated by increasing lamb strikes, but also showing an increase in the number of strikes on adult sheep. (4) The final phase of equal adult and lamb susceptibility to strike. The onset and duration of these phases differs markedly between mountain and lowland breeds.

Blowfly strike may occur on any part of the body, but two-thirds of the total cases were from the region of the hindquarters and nearly two-thirds of the remainder occurred on the loins and back. The shoulder area, in view of its small size compared to other regions, is highly susceptible and there is no obvious reason for this susceptibility. As regards relative susceptibility of different breeds, it is only possible to state that the Scotch Blackface sheep appear to be more susceptible than Cheviot sheep. In breeding flocks, adult sheep appear to be more susceptible than lambs.

Strikes due to flies other than *L. sericata* occur mainly in mountain breeds and their lowland crosses, and cause body strikes. Of these alternative species, only *Phormia* appears to show a distinct preference for one age group, occurring mainly on adults. It appears that bracken and/or heather type grazings are associated with the conditions which result in strike by these alternative species.—J. B. CRAGG.

I. JOHNSTONE, I. L., & GRAHAM, N. P. H. (1941). **Studies on Fly Strike in Merino Sheep. No. 6.—Comparison of the Incidence of Crutch Strike in Plain-Breeched Sheep and in Wrinkly-Breeched Sheep Treated by the Mules Operation.**—*J. Coun. sci. industr. Res. Aust.* **14.** 229–232. [For previous parts, see *V. B.* **12.** 33]. **2391**

II. GRAHAM, N. P. H., RICHES, J. H., & JOHNSTONE, I. L. (1941). **Fly Strike Investigations—Experimental Studies on the Surgical Removal of Breech Folds in Lambs. The Mules Operation at "Marking-Time".**—*Ibid.* 233–241. **2392**

III. GRAHAM, N. P. H. (1941). **The Mules Operation: Factors to Consider in Selecting Time of Year and Age at which to Operate.**—*Ibid.* 241–244. **2393**

I. Plain-breeched sheep selected from a relatively wrinkly flock incurred more crutch strike (0·2–13·5%) than wrinkly-breeched sheep on which the Mules operation for removal of crutch wrinkles had been performed (0·0–3·5%). Control, wrinkly-breeched sheep not operated upon showed 2·8–42·0% of fly strike during the experimental period which extended over nine months. Crutching gave more effective and lasting protection against crutch strike in plain-breeched sheep and in wrinkly-breeched sheep treated by the Mules operation than in untreated wrinkly-breeched sheep. The Mules operation and a mid-season (early February) crutching almost entirely prevented crutch strikes in wrinkly-breeched sheep from one shearing to another, despite a severe and prolonged fly wave. The effect of fly strike on the general health of the sheep led to a high rate of culling which could have been avoided by proper use of the Mules operation.

II. Details of a number of experiments are given and the incidence of fly strike is recorded in several thousand sheep, treated in various ways. It was found

that it was more difficult to carry out the Mules operation efficiently in young lambs at marking time (lambs a few weeks to two months old), than at weaning time (lambs 4–5 months old). The following points are discussed :– the position in which the lamb is held for the operation, effects of the operation on lambs, and the value of the operation in preventing fly-strike from occurring between marking and weaning.

III. The Mules operation should be performed by beginners only on freshly crutched or shorn weaners until thorough proficiency is attained. Subsequently the operation should be performed in conjunction with lamb-marking unless the prevalence of bush flies (*Musca* spp.) or blowflies (*Lucilia cuprina* and others) at that time warrants postponement until weaning time. Adult sheep should also be treated, and the operation should be applied to any sheep affected by crutch strike, whether previously treated by the operation or not, if examination shows that skin folds are present in positions likely to be wetted by urine.—H. McL. G.

*Steiner, G. (1941). Untersuchungen über die Kältewiderstandsfähigkeit der Eier und Larven von Fleischfliegen. [**Resistance to Cold of Eggs and Larvae of Blowflies**].—*Anz. Schädlingsk.* **17.** 133. [Abst. from abst. in *Z. Fleisch- u. Milchhyg.* **52.** 232]. **2394**

S. investigated resistance to cold in eggs and larvae of *Lucilia caesar* and *Phormia regina*. Eggs of *P. regina* were able to develop after 12 days at temperatures between 4·5° and 2·5°C., after eight days at 0° to –3·5°C., after two days at –6°C., or after three hours at –18° to –24°C. Young larvae were equally resistant to cold except at the very low temperatures when they were more easily killed than the eggs. 50% of well developed larvae were alive after 70 days at 5°C., 30% after 55 days at 2°C., 20% after 35 days at –0·5°C., 5–10% after 10–20 days at –2°C. and 2–5% after 4–10 hours at –8·5°C. At –15°C. and below the greatest survival time was two hours. The survival time for *L. caesar* was shorter than for *P. regina*.

S. concludes therefore that normal cold storage conditions will not necessarily kill the blowfly and he discusses the implication of this work in relation to problems of supply in the army.—H. D. Crofton.

Parish, H. E. (1942). **Factors Predisposing Animals to Screwworm Infestation in Texas.**—*J. econ. Ent.* **35.** 899–903. **2395**

This paper records knowledge gained in the course of treating over 6,000 screwworm (*Cochliomyia americana*) infestations in eight types of livestock. The causes of infestation are grouped into five classes. (a) Man-made wounds accounted for 18% of all cases, and of these, shear cuts were the most common. (b) Wounds which could be eliminated comprised 13%, the major type being injuries at birth. (c) Wounds which in part could be prevented constituted 34%. Pasture conditions which might lead to infestation were included in this category. (d) Wounds arising from pathological conditions formed only 8%. (e) Wounds from causes which could not be controlled formed 27% of the total. —J. B. Cragg.

Howell, D. E. (1940). **The Ecology of Dermacentor albipictus (Packard).**—*Proc. 6th Pacific Sci. Congr. 1939.* **4.** 439–458. **2396**

The "winter" tick is widespread in Canada and the Northern U.S.A., and in mountainous areas as far south as Mexico. H. studied its ecology under Californian conditions.

Three peak periods of tick infestation of animals were observed, which were roughly coincident as to date during two successive winters. The first infestation, during September-October, was with larvae, nymphs, and adults developing from eggs which had hatched in the previous March. The second peak, in November-December, could only be explained as due to a fresh growth of pasture, causing livestock to penetrate new areas. The third peak, in January-February, was probably due to the hatching of larvae from eggs laid by ticks which began feeding during the first peak. The brood resulting from these January ticks would pass the summer as unfed larvae. The three peaks could not be correlated with weather conditions.

The incubation period of the eggs is 20–60 days, depending on the temperature. The newly hatched larvae undergo a resting period of one week to several months before attaching to a host. The average time for feeding is nine days, and for moulting 11 days. Unfed larvae can survive for 9–10 months.

Nymphs feed to repletion in about a week, and moult 6–8 days later. They survived 10–101 days when kept unfed in the laboratory.

Adult females are replete after 5–14 days' attachment to the host. The pre-oviposition period occupies about a further 23 days, and eggs to an average number of about 3,800 are laid during the next month.

All stages of this tick prefer a relative humidity above 70%, and the optimum for both longevity and development of maximum size is 80% R.H. A temperature of 35°C. produced the largest larvae, but the life span was greatest at 20°C. There was no significant response to light at any stage.—E. S.

Oxer, D. T., & Ricardo, C. L. (1942). **Notes on the Biology, Toxicity and Breeding of *Ixodes holocyclus* (Neumann).**—*Aust. vet. J.* **18.** 194–199. **2397**

The toxicity (capacity to cause tick paralysis) of the larvae as well as the nymphs of *I. holocyclus* has been observed. Under laboratory conditions, larvae were kept alive for 162 days, and nymphs for 275 days. Several dogs were successfully immunized against the adult tick by allowing ticks to spend progressively longer periods attached, and by later allowing several ticks to engorge concurrently. Anti-tick serum was successfully prepared by bleeding hyperimmunized dogs, but there was a great reduction in antitoxic titre of the serum of these dogs and some lost their own immunity, if ticks were not engorged on them at short intervals. For mass production of ticks it is necessary to use suitable hosts for each instar. G. pigs are suitable for mass engorgement of larvae, and bandicoots (*Perameles* sp.) for nymphs. Nymphs can engorge satisfactorily on dogs, but dogs are not suitable for large-scale engorgement. When obtained from tick-infested areas, the bandicoot is usually immune to tick paralysis, but this is not invariably the case.

A brief description is given of the methods used for the breeding of ticks.—H. McL. Gordon.

—. (1942). Decreto ley referente a la lucha contra la sarna bovina. [**Uruguay : Decree of May 27th, 1942, on Control of Bovine Mange**].—*Bol. mens. Direcc. Ganad., Montevideo.* **26.** 131–135. **2398**

This decree makes the treatment of cattle mange compulsory. Regular inspections of cattle will be made and infested herds put under a "standstill" order. The owner will be allowed 90 days in which to clean up the herd, failing which a fine of 50 pesos will be imposed. Further periods of 40 days may be granted for dealing with the condition, with further fines for failure to comply with the order.

Cattle affected with mange may not be transported and no permits can be issued licensing the transport of such cattle.—Miller Watson.

See also absts. **2361** (swine lice), **2378** (*Dermacentor andersoni*), **2496, 2497, 2502, 2524-2526** (insecticides).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

BROADBENT, M. (1942). **Survey of the Incidence, Distribution and Prevalence of the Helminth Parasites of the Domestic Fowl in Queensland.**—*Aust. vet. J.* **18.** 200–204. **2399**

The incidence, distribution, and prevalence in the domestic fowl in Queensland are given for *Heterakis gallinae, Ascaridia galli, Capillaria annulata, C. collaris, Oxyspirura mansoni, Raillietina tetragona, R. echinobothrida, R. cesticillus, Choanotaenia infundibulum, Amoebotaenia sphenoides, Davainea proglottina,* and *Hymenolepis* spp. *Acuaria* spp., previously recorded from Queensland, were not seen in the present survey. —H. McL. GORDON.

*MIKAČIĆ, D., & ERLICH, I. (1941). **[Helminth Parasites of Ducks].**—*Vet. Arhiv.* **11.** 453–476. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 380]. **2400**

The authors examined 100 ducks and 250 ducks' intestines. Examination of the birds showed that 4% were without parasites, 86% were infested with nematodes (mainly *Tetrameres fissispina*), 68% with cestodes (mainly *Hymenolepis gracilis*, 45% with trematodes (mainly *Echinostoma revolutum*), and 47% with *Polymorphus minutus.*

Examination of the 250 intestines gave the following :– *Notocotylus attenuatus* (4·5%), *Echinostoma revolutum* (20%), *Echinoparyphium recurvatum* (18%), *Hymenolepis collaris* (3·5%), *H. gracilis* (13%), *H. coronula* (1·6%), *H. anatina* (19%), *H. parvula* (0·4%), *H. setigera* (0·8%), *Diorchis* sp. (0·8%), *Porrocaecum crassum* (39%), *Trichostrongylus tenuis* (1·6%), *Capillaria* sp. (11%), and *Polymorphus minutus* (4·8%).—H. D. C.

NEUHAUS, W. (1941). Beiträge zur Frage der Wirtsfindung des Miracidiums von Fasciola hepatica. **[The Problem of how *Fasciola* Miracidia Find their Snail Hosts].**—*Z. vergl. Physiol.* **28.** 563–579. **2401**

N. describes experiments from which he concludes that the miracidia of *F. hepatica* are positively rheotactic and that they exhibit positive or negative chemotaxis according to the nature of the dissolved substances. In low and medium light intensities they exhibited positive phototaxis, but negative phototaxis in high light intensities. The miracidia showed positive chemotaxis at distances of 12–16 cm. from *Limnaea truncatula* and similar results were obtained with other limnaeids. A negative chemotaxis was noticed when *Polycelis nigra* and *Planaria torva* were used, while in experiments using *Bythinia tentaculata* and *Hydra,* no chemotaxis was observed. N. concludes that rheotaxis and especially chemotaxis are important factors, whereas phototaxis and geotaxis only help indirectly in finding a suitable host.

The specificity of *F. hepatica* for *L. truncatula* is said to be governed by (1) ability to develop in the host, (2) ability to invade the host, (3) ability to select suitable hosts, and (4) ecological factors (phototaxis and geotaxis.)—H. D. CROFTON.

*VOGEL, H., & MINNING, W. (1940). Bilharziose bei Elefanten. **[Schistosomiasis in Elephants].**—*Arch. Schiffs- u. Tropenhyg.* **44.** 562–574. [Abst. from abst. in *Bull. Inst. Pasteur.* **40.** 22]. **2402**

Eggs resembling those of schistosomes were found in the faeces of two Indian elephants. Attempts to infect snails of the species *Bulinus contortus, B. tropicus, Physopsis globosa, P. africana, Planorbis corneus, Pl. pfeifferi,* and *Pl. guadeloupensis* were mainly negative, feeble infestations being obtained in *Pl. pfeifferi* and an unidentified *Planorbis.* The cercaria is drawn and described.

Schistosome eggs of another type are described from African elephants. The adult worms were found in the mesenteric veins and described as *Bivetellobilharzia loxodontae* n. g., n. sp. Attempts to infest molluscs from Africa with the miracidia failed, but some *Limnaea palustris* of German origin developed a feeble infestation, which permitted the authors to infest a mouse.—H. D. CROFTON.

WILLEY, C. H. (1941). **The Life History and Bionomics of the Trematode, *Zygocotyle lunata* (Paramphistomidae).**—*Zoologica, N.Y.* **26.** 65–88. **2403**

W. gives a detailed account of the various stages in the life-history of *Z. lunata.* He found that ducks and rats were 100% susceptible to infestation. Establishment of the parasite in a sheep given 1,000 metacercariae in drinking water, was verified by the finding of considerable numbers of eggs of *Z. lunata* in the faeces of the sheep 11–12 weeks later. This lends credence to earlier records of this fluke from a cow and a deer.—E. S.

*GRAMICCIA, G. (1941). Le tenie dei polli della Campagna Romana. **[Tapeworms of Poultry in the Rome District].**—*R. C. Ist. Sanit. pubbl., Roma.* **4.** 929–972. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **142.** 395]. **2404**

G. describes seven species of cestodes found in the gut of hens from the Rome district. He gives statistics of the incidence of infestation. A dichotomous key is given for the separation of the various species found. —H. D. CROFTON.

BONNE, C. (1942). **Researches on Sparganosis in the Netherlands East Indies.**—*Amer. J. trop. Med.* **22.** 643–645. **2405**

In the Netherlands East Indies, *Diphyllobothrium ranarum* is a common tapeworm in dogs and cats. A local *Cyclops* sp. is the first intermediate host, and the sparganum stage is frequent in frogs and less frequent in toads. Sparganosis in man, frequently reported from the Far East, is of rare occurrence in the Malayan archipelago. Spargana found in natural infections in man and monkeys in Batavia, when fed to a cat, developed into *D. ranarum.* Experimentally, *Cyclops* can be easily infected. Tadpoles can be infected by feeding infected *Cyclops,* but adult frogs proved very difficult to infect ; in nature, however, infected tadpoles have not been discovered. Animals not suitable as hosts for the adult tapeworm develop sparganosis when infected either with infected *Cyclops* or with spargana from frogs or tadpoles. It is suggested that natural infections with spargana in man and domestic animals are probably acquired in either way.—H. E. HARBOUR.

*CARTA, A. (1941). Biologia ed azione patogena del " Mesocestoides lineatus " e delle sue forme larvali (Nota riassuntiva). **[Biology and Pathogenicity of *M. lineatus* and its Larval Stage].**—*Profilassi.* **14.** 83–93. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 491]. **2406**

C. describes cysts found in the gut wall, liver, lungs, and mesenteric lymph nodes of cats and dogs. Cats and dogs fed these cysts developed *M. lineatus* infestation. The cyst is described as being similar to *Cysticercus cellulosae, i.e.,* a true cysticercus. [This supports CHOLODKOVSKY (1917), but not other workers.]

In histological structure, the larvae within the cysts are said to be similar to *Tetrathyridium bailleti.* The presence of larvae of *M. lineatus* in cats and dogs is rare and cats and dogs are not likely to be the normal intermediate host.

C. says that these cysts may multiply and thus

produce so-called " ascites parametaria ", and regards the presence of tetrathyridia in the body cavity as a later stage of the same infestation. [See also *V. B.* **11.** 871, and **12.** 221.]—H. D. CROFTON.

MAHR, M. M. (1942). **Precipitin Reactions and Species Specificity of Monezia expansa and Monezia benedeni.**—*Biol. Bull. Wood's Hole.* **83.** 88–90. **2407**

WILHELMI (1940), as a result of experiments performed with nine species of helminths, defined a species as " a group of organisms the lipid-free antigen of which, when diluted to 1 : 4,000 or more, yields a positive precipitin test within one hour with a rabbit antiserum ", the latter being produced by previous injection of the antigen into a rabbit, according to a routine which W. laid down.

M. confirms this hypothesis by his experiments with the two species of *Moniezia*, the homologous titre in each case being 1 : 4,000, and the heterologous titre 1 : 1,000, in reciprocal tests.—E. S.

*GRAMICCIA, G. (1941). Reperto di " Raillietina (Raillietina) Bothrioplitis " nel tacchino. [*R. (Raillietina) bothrioplitis* **in Turkeys**].—*R. C. Ist. Sanit. pubbl., Roma.* **4.** 708–712. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **142.** 395]. **2408**

G. found 16 specimens of *R.* (*Raillietina*) *bothrioplitis* in the intestines of two turkeys. This is a new host record.—H. D. CROFTON.

CHANDLER, A. C. (1943). **Studies on the Nutrition of Tapeworms.**—*Amer. J. Hyg.* **37.** 121–130. **2409**

Four groups of rats, each containing three males and three females, were given either a complete synthetic diet, a protein-free diet, a vitamin-free diet, or a diet without either proteins or vitamins. Each rat was then fed ten cysticercoids of *Hymenolepis diminuta*. Elimination of protein from the diet had no evident effect on establishment, growth, and reproductive capacity of the worms. Absence of all vitamins from the diet in male rats caused only a lowering of egg output from the worms, with no reduction in their establishment or growth, but in female rats there was a striking failure of the worms to establish themselves. Moreover, the single worm which became established in a female rat of the non-vitamin group was extremely stunted. Two worms found in female rats of the non-vitamin, non-protein group were somewhat larger than usual.

This effect of lack of vitamins in preventing establishment of worms in female rats but not in male rats was confirmed in a second experiment with larger groups of rats. In a third experiment, the factors concerned were analysed further. Groups of six adult female rats were given one of the following diets :– (1) complete except that carbohydrate was entirely replaced by cellulose in the form of ground wood-pulp, (2) carbohydrate partly replaced in this way, (3) lacking vitamin B_1, (4) lacking vitamin B_2 complex, and (5) lacking the fat-soluble vitamins A, D, and E. These rats were infected on the third day with *H. diminuta*, as before.

Lack of carbohydrates caused marked reduction in establishment of the worms and severe stunting of growth. Reduced carbohydrate caused a definite decrease in the size of the worms. Lack of vitamin B_1, or of vitamins A, D, and E had no apparent effect, but lack of the vitamin B_2 complex caused a marked stunting in the size of the worms without affecting the numbers established.

The conclusions are drawn that *H. diminuta* is independent of protein in the host's diet, but is dependent on dietary carbohydrate ; that it is independent of vitamins A, D, E, and B_1 in the diet, but is dependent on the vitamin B_2 complex, at least in female rats ; and that the effect of lack of vitamin B_2 is less in hosts deprived of protein. Reasons are given for supposing that proteins, vitamins, and possibly hormones and other substances are absorbed directly from the host's mucosa, and that tapeworm toxicity may be in part an induced vitamin B deficiency.—D. G. G.

BAUDET, E. A. R. F. (1941). Ueber das Verhältnis der Anzahl Männchen und Weibchen der freilebenden Generation von Strongyloides papillosus (Wedl, 1856). [**The Proportions between Males and Females in the Free-Living Generation of** *Strongyloides papillosus*].—*Z. InfektKr. Haustiere.* **57.** 288–296. **2410**

B. summarizes the literature relating to the free-living generation of *S. papillosus*, with particular reference to the proportion of males and females developing in cultures. He describes experiments in which he counted the number of males and females developing in cultures of faeces kept at 22°C. and 30°C. for 3–4 days, in order to determine the influence of temperature on the number of males and females developing. Accepting the premise that the sex of any given worm was predetermined and unalterable by external conditions, he concluded that change of temperature could alter the relative rate of development of the two sexes. At 30°C. he found mainly females in his cultures after 3–4 days ; at 22°C. a greater proportion of males was found. B. does not accept the possibility of a parthenogenetic phase.—H. D. CROFTON.

STEKHOVEN, J. H. S., Jr., & PICK, F. (1940). Zur Biologie des Strongyloides stercoralis Bavay und Strongyloides simiae Lü und Hoeppli. Typische und atypische Bewegungen, insbesondere der filariformen Larven. [**Biology of** *S. stercoralis* **and** *S. simiae*. **Typical and Atypical Movements, Especially of the Filariform Larvae**].—*Z. Parasitenk.* **12.** 36–53. **2411**

The authors studied the movements of filariform and rhabditiform larvae of *S. stercoralis* and *S. simiae* in water agar and in various solutions (HCl, $Ca(OH)_2$, NaOH, $CaCl_2$, NaOCl, $CuSO_4$, Hg_2Cl_2, phenol, lysol, potassium bichromate, potassium permanganate, H_2SO_4, and formalin) at varying concentrations.

Conclusions as to structure and the physiology of movement in the larva are drawn from observations of behaviour in the various solutions.—H. D. CROFTON.

*WETZEL, R. (1940). Zur Biologie des Fuchslungenwurms Crenosoma vulpis. [**Biology of** *C. vulpis*, **the Lungworm of Foxes**].—*Arch. wiss. prakt. Tierheilk.* **75.** 445–460. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **142.** 399]. **2412**

W. describes the development of *C. vulpis* as indirect, the intermediate host being a terrestrial snail in which the third-stage or infective larva is reached. The first moult occurs 8–11 days and the second moult 12–17 days after the invasion of the snail, which is invaded *via* the foot.

The third and fourth moults occur 60–65 hours and seven days respectively after invasion of the definitive host. The " prepatent " period in foxes and dogs is approximately 19 days.—H. D. CROFTON.

—. (1942). **The Meat You Eat. Report of the New York State Trichinosis Commission.**—*New York State Legislative Document* (*1942*). No. 35. pp. 141. **2413**

The New York State Trichinosis Commission, set up in 1940 to study trichinosis and other diseases contracted by eating infected meat, was continued for a further year in order to make a detailed study of the meat-inspection problem. The Commission has now issued its second report, an attractively produced and

very readable booklet, plentifully illustrated with photographs and resembling a popular magazine rather than a "legislative document".

The recommendations of the previous report [see *V. B.* **12.** 398.] had largely been adopted. The law now requires the licensing of abattoirs and their maintenance in a sanitary condition; intra-state pork products customarily eaten without cooking are required to be processed in order to destroy trichinae; use of pork in "hamburgers" is forbidden; feeding of swine with uncooked abattoir offal is forbidden; a meat-inspection bill for educational purposes has been introduced. In addition, regulations requiring the cooking of garbage fed to pigs have been adopted.

Research projects in trichinosis include the testing of sulphaguanidine in treatment of experimental trichinosis in rats, and the testing of calcium gluconate and related compounds in neutralizing the toxic effects of the larvae after their migration to the muscles.

The Commission repeats its recommendation for establishing informal inter-departmental committees and for the institution of an educational campaign. Further specific recommendations deal with meat inspection and suggest the adoption of a comprehensive compulsory meat-inspection system throughout New York State on a self-supporting basis, the cost to be met by fees payable by abattoirs and meat-packing concerns. Administration would be by local government authorities in accordance with regulations of the State Department of Agriculture and Markets, and where existing local meat-inspection services were taken over by the state, the local meat inspectors and veterinary surgeons would have an opportunity to join the state service after passing a qualifying examination.

"The Story of Trichinosis" is the title of the second section of the report which presents a brief summary of the 1941 report with a few additions. The difficulty of diagnosis is stressed. The biggest outbreak recorded in 1941 comprised 80 cases, the source of infection being unprocessed "mettwurst". Necropsy studies published in 1941 showed the presence of the parasite in the diaphragm in 16·7% of 4,976 representative cadavers. A summary of the data on the incidence of trichinosis in swine showed that 6·2% of 12,000 hogs fed on raw garbage, 0·8% of 22,000 grain-fed hogs, and 0·4% of 2,800 hogs fed on cooked garbage were infested. Further reports on the evaluation of skin and precipitin tests on swine had appeared but these tests, at present, do not offer a solution to the problem of controlling trichinosis by detection of infected hogs. On the question of immunity, studies had shown that previous infection in man did not always protect against illness or death from a superimposed infection. There was thus little hope of a gradual development of an immunity in the population leading to biological control of the disease.

The third part of the report is devoted to the meat-inspection problem. Preliminary chapters deal with the value of meat as a food and give some details of the meat industry. About half the farm land of the U.S.A. is partly or wholly used in supplying the country's meat; the meat-packing industry employs over 100,000 workers and processes over 50 million pounds of meat a day. A detailed analysis is given of the sources of meat supply for the City of Syracuse. Further chapters deal with the sanitary requirements for abattoirs, the advantages of meat inspection, and a detailed account of existing meat-inspection conditions in New York State. The cost of state-wide meat inspection, if introduced, in New York State is estimated at one-quarter of a cent per pound of meat inspected.

[This is an interesting report which merits consideration by those interested in framing meat-inspection regulations in other countries. The educational value of such a report, issued in attractive, readable form, must be considerable.]—H. E. Harbour.

*van der Meer, G., de Graaf, J. F. H., & Brug, S. L. (1941). **[Trichinosis in Holland]**.—*Ned. Tijdschr. Geneesk.* pp. 4710–4716. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 46]. **2414**

The authors, using the compressorium and the artificial digestion methods, carried out examinations for trichinae on the diaphragms of 1,001 patients who had died in hospital in Holland. In only two cases were trichinae detected, one in a 67-year-old man, the other in a 60-year-old woman. The authors conclude that the incidence of trichinosis is low in Holland.—H. D. C.

Wollschläger, P. (1941). Genügt die Untersuchung der Muskeln des Zwerchfellpfeilers allein für ein einwandfreies Ergebnis der Trichinenschau? **[On the Sufficiency of Examining the Pillars of the Diaphragm for Evidence of Trichinosis at Meat Inspection]**.—*Z. Fleisch- u. Milchhyg.* **51.** 272. **2415**

Two out of three swine at an abattoir were condemned for trichinosis. The third appeared free since no trichinae were found in 28 muscle preparations from the pillars of the diaphragm. Further examination of preparations from the abdominal muscles, however, showed quite definite trichina infection. Doubt is cast on the efficacy of the official test as required in Germany, since this pig would normally have been passed.

—H. E. Harbour.

Gaase, A. (1942). Die Trichinoseforschung nach dem Schrifttum der letzten Jahre mit besonderer Berücksichtigung eigener Komplementbindungsergebnisse beim Menschen und in Tierversuchen. **[Trichinosis Investigations Recorded in Recent Literature, with Special Consideration of the Author's Experiences with the Complement-Fixation Reaction in Man and Animals]**.—*Dtsch. Militärarzt.* **7.** 442–448. **2416**

In the course of a brief survey of recent developments in many aspects of research on trichinosis, G. describes some work of his own on diagnosis by complement fixation. In g. pigs which were infected by feeding them infected rat flesh, the c.-f. test was negative after 12 days in two cases, and only moderately positive in a third case. In g. pigs fed on infected g. pig flesh, however, strongly positive reactions were obtained six days after infection, and in one case a weakly positive reaction was observed after only three days. A strongly positive reaction was obtained in a rabbit nine days after it was fed infected g. pig flesh.

A pig was infected by feeding it, on three occasions six days apart, infected rat, g. pig, and rabbit flesh respectively. No reaction was observed until a moderately positive one was shown three weeks after the third feeding, but G. suggests that as the pig showed no symptoms after the first two infective feeds, it did not, in fact, become infected until after the third feed. [Pigs ordinarily show little, if any, disturbance in condition due to trichinosis, and it seems equally probable that only the third feeding produced an infection heavy enough to be capable of provoking either symptoms or the formation of complement-fixing antibodies in this host.] Four and five months after the last infective feed, the c.-f. test in this pig was again negative, and G. suggests that this may have been correlated with the calcification of the cysts in the muscles. [In view of this, a case presented of a strongly positive reaction in a human being believed to have become infected 24 years previously, is not very convincing; biopsy showed the trichinae in this case to be encapsulated and partially

calcified, which finding is suggestive of a much more recent infection.]—E. S.

GAASE, A. (1942). Die Komplementbindungsreaktion auf Trichinose mit dem neuen Schweine-Antigen. **[The Complement-Fixation Reaction in Trichinosis with a New Pig Antigen].**—*Münch. med. Wschr.* **89.** 761–762. **2417**

Previous work by G. [see preceding abst.] had shown a positive complement-fixation reaction in g. pigs only a few days after feeding with trichinosed g. pig flesh. This result, thought to be due to an adaptation of the trichinae to the host, suggested the use, in testing human cases, of an antigen more nearly related to the cause of human trichinosis than the rat trichina antigen normally employed. Five sera giving weakly positive or negative reactions to the rat antigen gave strong positive reactions when tested in the same dilutions with a pig antigen ; control sera gave negative results. The results were striking and, although the number of sera tested was small, it is suggested that the use of the pig antigen gives hope of earlier diagnosis.

—H. E. HARBOUR.

WAGNER, O. (1942). Fortschritte der Trichinoseforschung in epidemiologischer und diagnostischer Hinsicht. **[Advances in Trichinosis Research. Epidemiology and Diagnosis].**—*Hoppe-Seyl. Z.* **274.** 116–128. **2418**

W. reviews recent findings in the epidemiology of trichinosis. In Germany the work of SCHOOP [*V. B.* **12.** 595.] and of others had shown foxes and badgers to be a fruitful source of infection while field mice could not be incriminated. In Norway, AASER [*V. B.* **12.** 596.] had shown a high incidence in fur-bearing animals. The danger of recrudescence of trichinosis through an increase in the breeding of fur-bearing animals is commented upon. Rats are not now a major source of infection in Germany, but in Norway and in South America the incidence in rats is reported to be much higher ; on one Norwegian farm 75% of the rats examined were trichinosed.

The recognition of the importance of the wild fauna in relation to the epidemiology of trichinosis is a great step forward.

Details are given of the preparation of trichina antigen and its use in the complement-fixation reaction according to the method of GAASE [see two preceding absts.]. In intradermal tests the antigen did not give such reliable results as in the c.-f. test on account of variability of nonspecific skin reactions. The precipitin reaction was also unreliable and the c.-f. test was the method of choice.

The review concludes with a comprehensive bibliography covering the literature from 1937–41.

—H. E. HARBOUR.

CULBERTSON, J. T. (1943). **Natural Transmission of Immunity against *Trichinella spiralis* from Mother Rats to their Offspring.**—*J. Parasit.* **29.** 114–116. **2419**

Normal adult female rats were immunized before mating by doses of 200 isolated *Trichinella* larvae. Rats infected 2–5 months before parturition gave the most satisfactory results.

Half the litter of an immune mother rat was exchanged at birth with half the litter of a normal mother, and several days later all the young were infected with 250 isolated *Trichinella* larvae. Five days later all the young were killed and their intestines examined for adult *T. spiralis*. The young nursed by the immune mother yielded considerably fewer adult worms (average five) than those nursed by the normal mother (average 60).

In a further experiment similarly exchanged nursling rats were infected at 13 days of age with 250 larvae. After 34 days their carcasses were digested and counts were made of encysted larvae. Considerably fewer larvae (average 9,873) were recovered from the rats nursed by the immune mother than from those nursed by the normal mother (average 53,850).

From these experiments it is concluded that the immunity acquired by rats after infection with *T. spiralis* is transmitted to their young mainly, if not entirely, through the milk, and not through the placenta.

—D. G. GILMOUR.

FISCHTHAL, J. H. (1943). **Number of Larvae and Time Required to Produce Active Immunity in Rats against *Trichinella spiralis*.**—*J. Parasit.* **29.** 123–126. **2420**

Four groups of eight rats were fed respectively either 80, 160, 320, or 640 isolated larvae of *T. spiralis*. In order to test the immunity produced by this infection, a second dose of 10,000 larvae was given to one-half of the rats in each group after seven days, and to the other half after 14 days. Only two survived of the 16 rats given the second dose after seven days. Large numbers of adult worms (2,592–6,828) were recovered from the intestines of those which died. In contrast, 15 survived out of the 16 rats given the second dose after 14 days. Nine of these were killed seven days after reinfection and had only small numbers of adult worms in their intestines (seven had 1–33 ; the other two had 221 and 546 respectively). Two previously uninfected rats given 10,000 larvae had over 3,000 adults each. From these results it is concluded that at least 14 days are necessary for the full development of immunity against the intestinal phase of trichinosis.

In order to estimate the degree of immunity produced by each initial dose of larvae, the surviving rats were killed 42 days after reinfection and counts were made of the larvae encysted in their muscles. The counts were compared with those previously obtained for graduated doses of larvae given to unimmunized rats [see *V. B.* **8.** 448]. It is concluded that the dose of 80 produces a fairly high degree of immunity in 14 days, the dose of 160 a higher degree, and the doses of 320 and 640 apparently produce complete immunity in 14 days. Little or no immunity is produced within seven days by doses up to 640 larvae.—D. G. GILMOUR.

ANDREWS, J. S. (1942). **Stomach Worm (Haemonchus contortus) Infection in Lambs and its Relation to Gastric Hemorrhage and General Pathology.**—*J. agric. Res.* **65.** 1–18. **2421**

Nineteen lambs, 2–8 months old, were used in this study in which doses of 2,000–181,000 infective larvae of *H. contortus* were given to lambs in single and multiple doses. Two of the lambs were kept as uninfested controls and one other was used to show the effect on the blood picture of almost daily bleeding in the absence of worm infestation. Haematological studies were made throughout the experiment and the benzidine test was used for detection of blood in the faeces. In two lambs, fatally infected, an estimation was made of the total quantity of blood passed in the faeces (the method is described). Blood appeared in the faeces 6–10 days after infection, while eggs were first detected about 20 days after infection. In two cases death occurred before eggs had appeared, whereas in one non-fatal case a count of 24,800 E.P.G. was reached. In lambs recovering from the infection, there was a definite negative correlation between the degree of anaemia and the number of worm eggs per gramme of faeces. In one fatal case, a drop in egg count was not followed by improvement in haemoglobin or erythrocyte count ; on autopsy, 1,474 male and only 92 female *Haemonchus*

were found. In two fatally infected lambs, amounts of 1,492 ml. and 2,380 ml. respectively of blood were detected in the faeces over a period of ten days, *i.e.* 1·57 and 2·5 times the calculated blood volumes. 3,560 ml. of blood, or 2·5 times the blood volume, were taken from the jugular vein of a non-infected lamb over a period of 15 days; this produced approximately the same degree of anaemia as in the fatally infected lambs. The data presented give strong support to the argument that the anaemia associated with *H. contortus* infection in sheep is due to gastric haemorrhage alone. Further support is given by the gross pathology and histological findings which are described.—H. E. HARBOUR.

*BONELLI, G. (1941). L'haemoncus bovis nuova specie nel Sidamo. [*Haemonchus bovis*, **a Species New to Sidamo, Abyssinia**].—*Ann. Pat. trop. Parassit.* **2.** 292–294. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 605]. **2422**

B. confirms the description of *Haemonchus bovis* Roetti 1940, and records its occurrence in the abomasum of cattle in the Sidamo district of Abyssinia.—H. D. C.

TAYLOR, E. L. (1943). **The Interaction of Nutrition and Parasitism with special reference to Parasitic Gastritis.**—*Vet. Rec.* **55.** 117–119. **2423**

There is discussion of the part played by faulty nutrition in altering the normally harmonious host-parasite relationship in the direction of disease production. An analysis is made of the development of parasitic gastritis in sheep. It is pointed out that the critical period for lambs is weaning at a time of year when the quality and quantity of herbage on the pasture is poor, as this undermines the immunity to infestation which the lambs are beginning to develop at this time. It is suggested that supplementary feeding or suitable anthelmintic treatment should be given at this stage. —D. G. GILMOUR.

WHITLOCK, J. H., CALLAWAY, H. P., & JEPPESEN, Q. E. (1943). **The Relationship of Diet to the Development of Haemonchosis in Sheep.**—*J. Amer. vet. med. Ass.* **102.** 34–35. **2424**

This is a short account of an attack of haemonchosis in a flock of sheep in Kansas. Thirty of the ewes most affected were taken off pasture and given plenty of alfalfa hay and yellow maize. Egg counts at the beginning of this treatment and eight days later indicated a marked reduction in infestation, presumably caused by the improved food. It is suggested that vitamin A might be the factor, lack of which brought on the attack when the summer sun had baked the pasture brown.

[The tables referred to, and the list of references, have not been printed.]—D. G. GILMOUR.

WATT, J. Y. C., GOLDEN, W. R. C., OLASON, F., & MLADINICH, G. (1943). **The Relationship of Vitamin A to Resistance to Nippostrongylus muris.** —*Science.* **97.** 381–382. **2425**

In each of the following experiments, two different vitamin A deficient diets were used, and control groups of rats received the same diets supplemented with vitamin A concentrate. Each group contained five or six rats. Vitamin A depletion was checked in each case by analyses of liver and plasma.

(1). Young rats were placed on the diets for 56 days, then infected subcutaneously with 2,300 *N. muris* larvae. Twelve days later gut counts showed significantly greater infections in the A-deficient rats than in those receiving vitamin A supplements.

(2). Twenty-two young rats were "hyperimmunized" with three successive fortnightly doses of 2,000 larvae, then placed on the experimental diets, and 79 days later infected with 2,000 larvae each. At autopsy 12 days later practically no worms were recovered from the rats receiving supplements of vitamin A, while moderate numbers were recovered from the A-deficient rats. Evidently the acquired immunity had been broken down by lack of vitamin A.

(3). Normal rats were infected with 600 larvae and given at the same time an intraperitoneal dose of plasma from rats which had been "hyperimmunized" and fed on either a complete or a vitamin A deficient diet. The A-deficient rats transferred a lower degree of immunity by way of the plasma than did the rats receiving vitamin A. The possibility of such transfer had been shown previously [see WATT—*V. B.* **13.** 324]. —D. G. GILMOUR.

*ZANNELLI, C. (1941). Ricerche sul ciclo evolutivo degli ascaridi. [**Life-Cycle of Ascarids**].—*Riv. Parassit.* **5.** 177–188. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **142.** 401]. **2426**

Z. describes his method of studying the life-cycle of *Ascaris* spp. by artificial infection of g. pigs and rats. G. pigs proved refractory, a light infestation being found only in the liver of very young, but not of adult animals. The rats did not become infected.—H. D. C.

See also absts. **2432** (parasites of wild life in British Columbia), **2388** (*Strongyloides*), **2495**, **2498**, **2499**, **2527-2537** (anthelmintics), **2554** (egg counts).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS

[INCLUDING FOWL PARALYSIS]

RENK, W. (1942). Verhornender Plattenepithelkrebs des Euters bei einem Reh. [**Cornified Epithelioma of the Udder of a Roe Deer**].—*Arch. wiss. prakt. Tierheilk.* **77.** 319–327. **2427**

A description of an extensive ulcerating epithelioma of the udder in an 11-year-old roe deer, with metastases in the supramammary and iliac lymph nodes. There was considerable keratinization of the squamous epithelial cell columns, and it is suggested that the growth arose from the epithelium of milk ducts. —E. G. WHITE.

WHITE, J., & EDWARDS, J. E. (1942). **Effect of Supplementary Methionine or Choline plus Cystine on the Incidence of p-Dimethylaminoazobenzene-induced Hepatic Tumors in the Rat.**—*J. nat. Cancer Inst.* **3.** 43–59. **2428**

The findings of GYÖRGY *et al.* [see *V. B.* **12.** 493.] were not confirmed: the addition of cystine, choline or methionine did not appear to influence the incidence of hepatic tumours in rats receiving *p*-dimethylaminoazobenzene.—ALASTAIR N. WORDEN.

DOBRINER, K., GORDON, E., RHOADS, C. P., LIEBERMAN, S., & FIESER, L. F. (1942). **Steroid Hormone Excretion by Normal and Pathological Individuals.** —*Science.* **95.** 534–536. **2429**

A systematic investigation was undertaken, involving extensive fractionation and chemical characterization of the constituent steroids in 2–6 month collections of urine from six normal individuals, six patients with cancer, and four patients with hyperplasia of the adrenal gland. The cancer patients were found to excrete smaller amounts of total ketosteroids than the other two groups; in the urine of both the cancer patients and those with adrenal hyperplasia, the ratio of the various steroid fractions varied from one individual to another and the distribution of the fractions

was not as constant as those in normal individuals.
—J. P. Gardner.

*Mohos, J. (1941). Beitrag zur gemeinsamen Herkunft des Sarkoms und der Hühnererythroleukose. [**The Common Origin of Fowl Sarcoma and Erythroleucosis**].—*Közl. Összehas. élet- és kórtan Köréből.* **29.** 179. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 344]. **2430**

The work here reported was described previously in an inaugural dissertation [see *V. B.* **11.** 43].

See also abst. **2477** (melanoma).

DISEASES, GENERAL

Gordon, R. F. (1942). **Diseases of the Rabbit.**—*Vet. J.* **98.** 152–163. **2431**

In a paper intended as a refresher course for poultry instructors, G. outlines the symptoms, lesions, and control measures, principally hygienic, in the common bacterial, virus, and parasitic diseases of rabbits. He mentions an important new disease of young rabbits of which the aetiology is not fully understood and the symptoms and lesions are somewhat variable. Nonspecific diseases due to faulty diet or management are also referred to.—C. V. Watkins.

Cowan, I. McT. (1942). **Report upon some Diseases and Parasites of Game Birds and Game and Fur-bearing Mammals in British Columbia.**—*Rep. prov. Game Comm. B.C., 1941.* Reprint pp. 6. **2432**

This report covers chiefly diseased or dead birds and mammals brought in for diagnosis. Conditions found in birds included avian TB. in a ruffed grouse and an American widgeon, botulism in a pintail duck, and fowl pox in sooty grouse. Haemorrhagic septicaemia was provisionally diagnosed in a bighorn ram, but cultures could not be made. Broncho-pneumonia of undetermined origin was the cause of death in two bighorn ewes. A mule-deer, *Odocoileus hemionus hemionus*, was heavily infested with *Fascioloides magna*, and showed the pigment deposition in the mesenteries typical of this infestation in Bovidae, but infrequent in Cervidae. Six mink had apparently died from food poisoning, after a diet consisting largely of frozen herring and candlefish. Two specimens of *Trichuris ovis* and 90 of *Nematodirus* sp. were found in a bighorn ram. Unidentified tapeworm cysts were found in muscle from the thigh of a moose. The life-cycle was not determined.—E. S.

McNutt, S. H. (1942). **Diseases Causing Encephalitis in Cattle.**—*Cornell Vet.* **32.** 127–134. **2433**

Diseases causing encephalitis in cattle in the U.S.A. are described. They are rabies, Aujeszky's disease, malignant catarrhal fever, listerellosis, and sporadic bovine encephalomyelitis. None of these diseases has caused serious loss to the cattle industry in the U.S.A., but collectively they exact a toll. Other conditions mentioned in which the syndrome resembles encephalitis are ketosis, milk fever, and "cornstalk poisoning". Encephalitis does not cause death in less than 24 hours, except in that due to listerellosis, whereas poisoning results in quick death without rise of temperature.—J. A. Griffiths.

Work, S. H., Hamre, C. J., Henke, L. A., & Harris, L. E. (1943). **A Note on the Effect on the Kidneys and Livers of Feeding Urea to Steers Fattening in Dry Lot and on Pasture.**—*J. Anim. Sci.* **2.** 166–169. **2434**

Liver and kidney damage did not result during long-term feeding experiments (dry lot) in which the rations contained 0·88 and 2·29% urea on a dry matter basis. The nutritional aspects of the experiment are to be reported elsewhere.

It had previously been reported by Hart *et al.* [(1938). *J. Dairy Sci.* **22.** 785.] that renal damage occurred when urea formed 2·8 or 4·3% of the ration.
—Alastair N. Worden.

Ubach, F. A. (1941). Observaciones sobre la enfermedad de Johne y la enteritis coccidiósica de los bovinos, ovinos y caprinos identificadas en la República Argentina. [**Johne's Disease and Coccidial Enteritis in Cattle, Sheep, and Goats in Argentina**].—*Rev. Med. vet., B. Aires.* **23.** 3–45. **2435**

This is a survey of present knowledge of the diseases under consideration. U. describes in detail Johne's disease in bovines and coccidiosis in cattle, sheep, and goats, and gives methods of differential diagnosis. The pathological histology of the diseases is illustrated with photomicrographs.—M. Watson.

Holman, H. H., & Pattison, I. H. (1943). **Further Evidence on the Significance of Vacuolated Nerve Cells in the Medulla Oblongata of Sheep Affected with Scrapie.**—*J. comp. Path.* **53.** 231–236. **2436**

Vacuoles were found in nerve cells in the medulla oblongata in each of 75 clinical cases of scrapie. No vacuoles were found in 58 of 59 healthy sheep, nor in 35 of 39 sheep that died from diseases other than scrapie or were killed. It is possible that faulty nutrition may to some extent account for the occurrence of vacuoles. Vacuolated cells were found in greatest number in the medulla, but were also present in the spinal cord, pons, and mid-brain. The distribution of vacuolated cells in the medulla appears to be selective for certain groups of cells, notably the reticular formation and the medial vestibular and lateral cuneate nuclei.

Although the presence of vacuoles cannot be considered pathognomonic of scrapie, their demonstration may be a useful method of diagnosing the disease in conjunction with suggestive clinical symptoms.
—E. G. White.

Love, W. G. (1942). **Parenchymatous Goiter in Newborn Goat Kids.**—*J. Amer. vet. med. Ass.* **101.** 484–487. **2437**

The histology of the thyroid gland is influenced by a number of factors, such as age and sex of the individual and the time of the year. It is, in consequence, difficult to decide the exact point at which a purely hyperplastic increase in the tissue becomes pathological. The literature upon this point is discussed at length, detailed reference being made to the histological changes involved.

Four cases of parenchymatous goitre in still-born kids are described. All were from dams affected with *Brucella melitensis*, although this fact is not considered to be of any significance. Since two were born hairless, a tentative diagnosis of iodine insufficiency was made. The gross and histological changes upon which a diagnosis of parenchymatous goitre was made are described.—N. S. Barron.

Hass, G. (1942). **Studies of Amyloid. II. The Isolation of a Polysaccharide from Amyloid-Bearing Tissues.**—*Arch. Path.* **34.** 92–105. [For part I, see *V. B.* **11.** 466]. **2438**

A compound with polysaccharide-like properties was isolated by semi-quantitative methods from amyloid-bearing spleens and livers obtained P.M. from human patients with chronic pulmonary TB. The amount isolated was, in each case, proportional to the estimated quantity of amyloid, though it apparently

represented no more than 1·5% of the amyloid matrix. In properties and principal degradation products, the preparations appeared to be similar to samples of chondroitin-sulphuric acid obtained from infantile cartilage.—J. LOCHIEL MCGIRR.

HJÄRRE. (1942). Ueber Amyloidose bei Tieren mit besonderer Berücksichtigung atypischer Formen. **[Amyloidosis in Animals with Special Reference to Atypical Forms].**—*Berl. Münch. tierärztl. Wschr.* Nov. 13th. 331–334. **2439**

Whereas in typical amyloidosis in animals the amyloid material is deposited mainly in the liver, spleen, kidneys, and adrenals, in the so-called "atypical cases" there is a localized deposition in other organs or tissues such as the lungs, skin, or muscles. H. has seen 16 cases, 11 in the horse and one each in the ox, dog, cat, swan, and wild duck. In the horse, three forms of the condition were distinguished :– (1) amyloid deposition in the skin and local lymph nodes (seven cases), affecting the head, neck, and anterior part of the thorax; (2) amyloidosis of the respiratory tract with tumour-like masses in the nasal cavities and histologically demonstrable amyloid deposits in the mucosa of the rest of the upper part of the respiratory tract (three cases); (3) deposition of amyloid in multiple secondary round-cell sarcomas (one case). In the other species mentioned the distribution of amyloid was :– coronary vessels (dog); pancreas (cat); the usual organs and also the thymus (swan and wild duck); liver, kidney, and spleen, the last with massive deposits accompanied by lipoidosis (ox).

Association of amyloid deposition with particular diseases varies widely in different species. In TB., amyloidosis is found in 60–70% of fowls, 40–50% of horses, about 4% of dogs, and practically never in cattle.—E. G. WHITE.

WILENS, S. L. (1943). **The Effect of Postural Hypertension on the Development of Atheromatosis in Rabbits Fed Cholesterol.**—*Amer. J. Path.* **19.** 293–305. **2440**

A rise in systolic blood pressure was noted in rabbits forced to sit upright in glass jars. The change was from 43–84 to 59–81 mm. Hg in the case of normal rabbits, and from 85–122 to 124–169 mm. Hg in the case of rabbits made hypertensive by surgical means. Rabbits which were placed in the upright position for five hours daily developed more abundant deposits of lipids in the intima of the aorta than did rabbits receiving the same high-cholesterol diet, but not subjected to postural change. No evidence could be obtained that mechanical trauma of the aorta was responsible for the increased deposition of lipid.—ALASTAIR N. WORDEN.

CAIRNS, J. M. (1941). **The "Early Lethal" Action of the Homozygous Creeper Factor in the Chick.**—*J. exp. Zool.* **88.** 481–503. **2441**

From a detailed histological study of embryos from the same "creeper" stock as that investigated by LANDAUER [*V. B.* **12.** 173.], it was concluded that the early lethal effect of the "creeper" factor was localized in the vascular system, all other structural changes being secondary. A condition closely resembling that of "creeper" embryos could be set up in genetically normal White Leghorn embryos (10–18 somites) by surgical blocking of the forming vitelline arteries.
—ALASTAIR N. WORDEN.

FREEMAN, N. E., & SCHECTER, A. E. (1942). **No Demonstrable Substance Causing Increased Capillary Permeability in Lymph from an Injured Area.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 29–31. **2442**

Lymph obtained from the leg of a dog when injected into the same dog or into a second dog caused no increase in tissue permeability as judged by diffusion into the tissue at the site of injection of a blue dye injected intravenously. After injury to the leg, the lymph caused increased tissue permeability in the second dog but not in the first. The factor responsible for the latter effect was probably serum protein, which is known to appear in lymph after local trauma, since further experiments indicated that arterial and venous blood serum and plasma caused increased tissue permeability in other dogs but not in the animal from which the blood was drawn.—R. MCANALLY.

See also abstr. **2556** (diseases of goats), **2559** (of animals in Poland), **2480** (sterility in sheep), **2474** (enzootic jaundice), **2538** (calf scours).

NUTRITION AND METABOLIC DISORDERS

VOLLMER, E. P. (1943). **Relation of Hypopituitarism and Starvation. [Correspondence].**—*Nature, Lond.* **151.** 698–699. **2443**

The theory is advanced that the severity and persistence of the effects of chronic malnutrition are due largely to general endocrine deterioration and, in particular, to the inability of the anterior pituitary to send out its "tropic" hormones. [The theory is developed in relation to the nutritional problems likely to arise after the war; it is of direct interest to veterinarians, however, in view of the fact that many of our domestic animals, *e.g.* hill sheep, appear to exist on, at best, a suboptimal plane of nutrition for a considerable portion of the year.]—J. LOCHIEL MCGIRR.

KELLOGG, C. E. (1943). **Feeding Fish to Fur Animals.**—*Amer. Fur Breed.* **15.** 16–19. **2444**

A review article for breeders. The facts upon which it is based have already appeared in the *Vet. Bull.* [See GREEN *et al.*—*V. B.* **12.** 507].—A. N. WORDEN.

KOLLATH. (1942). Neue Erkenntnisse der Ernährungsforschung: Ueber die Begriffe Mesotrophie, Prärachitis und das Verhalten der Antikörper. **[New Advances in Nutrition and Research. The Concepts "Mesotrophy", "Pre-Rickets", and the "Relationship of Antibodies"].**—*Tierärztl. Rdsch.* **48.** 173–174. **2445**

This brief summary of an address to a conference includes outlines of the author's speculations on nutritional deficiency conditions and on the relation of deficiency diseases to immunity. The so-called "mesotrophic" concept of deficiency is concerned with alteration of cell metabolism due to lack of minerals or vitamins in a diet containing vitamin B_1 and potassium phosphate.—A. M. COPPING.

WEBSTER, G. T. (1942). **Cirrhosis of the Liver among Rats Receiving Diets Poor in Protein and Rich in Fat.**—*J. clin. Invest.* **21.** 385–392. **2446**

Necrosis and cirrhosis of the liver and cortical necrosis of the kidney, with haemorrhage, scarring, and focal necrotizing nephrosis, were observed in rats fed on a basal ration high in fat (38%) and low in protein and choline. The addition of extra casein and molasses or extra yeast decreased the severity of the lesions, whereas cystine or cholesterol increased it. Reduction of the fat content of the diet to 10% exerted some beneficial effect, as did the addition of betaine.
—A. N. WORDEN.

—. (1939). **Bibliography of References to the Literature on the Minor Elements and their Relation to Plant and Animal Nutrition.** pp. 487. [3rd Edit.]. **2447**

—. (1940). **Botanical Index to the Bibliography.** pp. 24. 2448

—. (1940). **First Supplement to the Bibliography.** pp. 82. 2449

—. (1941). **Second Supplement.** pp. 67. 2450

—. (1942). **Third Supplement.** pp. 78. 2451

[Compiled by WILLIS, L. G.] New York: Chilean Nitrate Educational Bureau, Inc. [4to].

This third edition contains 4,628 abstracts and references and a subject and author index; a botanical index to this edition has been published separately.

In the first supplement to this edition, it is pointed out that owing to the size of the Bibliography it is not practical to continue publication of complete editions and therefore supplements will be issued at intervals of approximately one year containing abstracts and references noted since publication of the third edition. In the supplements, a botanical index is included as well as the element and author indexes. [An error in paging occurs all through the second supplement so that each element is listed as being two pages further on than it really is, *e.g.* aluminium references in the index are listed as being on pages 5–7, but are on pages 3–5.]

Throughout, there appears to be a much greater number of references on botanical subjects than on subjects in relation to animal nutrition; nevertheless the series forms a very useful reference.—R. ALLCROFT.

BECK, A. B. (1941). **A Survey of the Copper Content of Western Australian Pastures.**—*J. Dep. Agric. W. Aust.* **18.** 285–300. 2452

Basing his results on the analyses of approximately 200 samples of Western Australian pastures and on relevant data on the health of stock, B. suggests the following classification. Samples from areas where copper deficiency symptoms occur in stock contain under 3 p.p.m. (dry basis). Samples from sound areas contain over 5 p.p.m., usually 7–12 p.p.m. Values between 3 and 5 p.p.m. are regarded as marginal. The criteria adopted for a "normal" or "sound" pasture were (1) no ataxia in lambs or "falling disease" in cattle has occurred on the property; (2) "stringy" wool is not grown by sheep, and (3) sheep, lambs, and cattle "do well".—M. C. FRANKLIN.

SNYDER, F. H., & TWEEDY, W. R. (1942). **The Effects of a Magnesium-Deficient Diet on the Serum Phosphatase Activity in the Albino Rat.**—*J. biol. Chem.* **146.** 639–647. 2453

When rats were fed on a magnesium-low diet, within a few days and before any signs of impaired nutrition were apparent, serum Mg fell to a low level and serum phosphatase activity, with and without added Mg, decreased considerably. At the same time there was a temporary increase in Ca deposition in the bones. The presence of unsaturated (lard) rather than saturated (butter) fatty acids in the diet failed to restore the phosphatase activity of the Mg-deficient serum.

—R. MCANALLY.

KEMPF, C. A., & NELSON, V. E. (1941). **The Influence of Sodium Fluoride upon the Composition of Tibiae of Rats Partially Recovering from Rickets.**—*Proc. Iowa Acad. Sci.* **18.** 199–205. [Authors' conclusions copied *verbatim*]. 2454

1. The amount of fluoride in rachitic bones was increased when vitamin D was administered along with sodium fluoride as compared with sodium fluoride alone.

2. This increase in fluorine content is proportionate to the increase in the ash content.

3. There was an increased calcification of bones as indicated by the line tests and ash determinations when vitamin D was administered to the ration containing fluoride as compared with a similar ration which did not contain fluoride.

BRUCE, H. M., & KASSNER, E. W. (1943). **Differences in Calcification between the Humerus and Femur of Young Rats receiving High Calcium, Low Calcium and Stock Diets.**—*Biochem. J.* **37.** 105–109. 2455

Measurements were made of the difference in percentage of ash in the fat-free dry humerus and femur of rats. In rats on a stock diet, low Ca diet, or low P (rachitogenic) diet with sufficient vitamin D added, the differences were not significant. In rats on a low P diet when vitamin D was deficient, the percentage of ash in both bones was much reduced and that in the femur was notably less than that in the humerus. The difference increased with decreased calcification. The fact that the metaphyses of the femur are large and also very poorly calcified in rickets partly, but not wholly, accounts for the difference between the two bones.

—R. MCANALLY.

FUHR, I., & STEENBOCK, H. (1943). **The Effect of Dietary Calcium, Phosphorus, and Vitamin D on the Utilization of Iron. I. The Effect of Phytic Acid on the Availability of Iron. II. The Effect of Vitamin D on Body Iron and Hemoglobin Production. III. The Relation of Rickets to Anemia.**—*J. biol. Chem.* **147.** 59–64, 65–69 & 71–75. 2456

I. The blood of rats fed upon a diet containing phosphorus in the form of phytic acid contained less haemoglobin than that of controls whose dietary P was inorganic. This was true both at an optimal level of Ca intake and at a four times optimal level which caused a lowering of haemoglobin and iron storage in the controls. There was, however, no apparent effect upon the total body iron at either Ca level.

II. The addition of vitamin D to a diet which was satisfactory as regards Ca and P content produced in rats higher levels of haemoglobin and body iron than the control diet. Storage of copper was not affected. The vitamin D caused an increase in the weight of the liver but not in total body weight.

III. Rickets due to low Ca or to low P concentration in the diet was not accompanied by decreased haemoglobin synthesis or storage of iron in the rat. This result was equally true in the presence or absence of vitamin D in the diet.—R. MCANALLY.

FERNANDES, C. J. (1940). **Famine and Vitamin A Deficiency in Cattle.**—*Indian Fmg.* **1.** 591–592. 2457

A great increase in eye troubles, especially blindness, was observed in cattle during the Jodhpur famine of 1939 and was stated to be due to deficiency of vitamin A. A characteristic symptom was the dryness of the cornea which later became wrinkled, opaque, and yellowish, and sometimes ulcers occurred due to secondary infection. As the period of malnutrition advanced, the eye-balls became glassy and motionless and protruded from the orbit. In some cases profuse salivation and incoordination of movement in the hind limbs were also present. A large number of abortions occurred among the pregnant cows. This was controlled when green fodder and cod liver oil were given. [There is no information on the number of animals treated.—ED.]

It is claimed that antimosan given at the same time parenterally helped in the proper absorption of vitamin A. [No explanation is given for administration of antimosan.—ED.] The cod liver oil treatment was discontinued after 20 days when the animals had shown considerable improvement, but nine pregnant cows gave birth to calves which were completely blind.—B. N. M.

—. (1941). **Annotated Bibliographies :– Alpha Tocopherol (Vitamin E),** pp. 92; **Supplement,** pp. 13.

Vitamin K, 2-Methyl-Naphthoquinone (Vitamin K-Active), Vitamin K_1, Vitamin K_2, Other Related Substances, pp. 78; **Supplement**, pp. 20. **Vitamin B_1 (Thiamine Hydrochloride)**, pp. 140; **Supplement**, pp. 31. **Riboflavin**, pp. 113; **Supplement**, pp. 12. **Vitamin B_6 (Pyridoxine)**, pp. 64; **Supplement**, pp. 11. **Nicotinic Acid**, pp. 130; **1st Supplement**, pp. 18; **2nd Supplement** (1942), pp. 56. **Pantothenic Acid**, pp. 50; **Supplement**, pp. 7. **Biotin**, pp. 49. **Ascorbic Acid, Vitamin C, in Wound Healing**, pp. 15. Rahway, N.J.: Merck & Co. [4to]. **2458**

In this series of booklets a great number of references are listed, abstracted, and classified so that information can be easily and rapidly found. Each vitamin is dealt with under the following headings:—(1) Chemical Investigation and Description; (2) Occurrence; (3) Physiological Activity, which includes the effects in experimental animals, in bacteria, *in vitro* in some cases, and in man; (4) Clinical Uses; (5) Toxicity; (6) Methods of Assay; (7) Place in Nutrition; this deals with the status of the vitamin in human nutrition. The volume on vitamin C deals only with the role of ascorbic acid in wound healing in both man and experimental animals. An author index is given at the end of each volume and the whole set provides a very useful source of information in brief. [See also *V. B.* **11.** 185, for earlier bibliography of riboflavin.] —R. Allcroft.

Follis, R. H., Jr., Miller, M. H., Wintrobe, M. M., & Stein, H. J. (1943). **Development of Myocardial Necrosis and Absence of Nerve Degeneration in Thiamine Deficiency in Pigs.**—*Amer. J. Path.* **19.** 341–357. **2459**

The pathology of the changes previously reported [see abst. no. 1970—*V. B.* **13.** 297.] is described. The characteristic changes comprised cardiac dilatation (without hypertrophy) and a pronounced myocardial necrosis which apparently developed earlier in the auricles than in the ventricles. Healed necrotic areas were found in the myocardium of some, but not all, animals which had passed through several periods of vitamin B_1 depletion. There were no nerve lesions.

The cardiac changes are regarded as specific for vitamin B_1 deficiency. They were not found in three cases in which the vitamin B_1 deficient diet had not been fed long enough to produce either clinical or chemical evidence of deficiency.—Alastair N. Worden.

Smith, S. G., Curry, R., & Hawfield, H. (1943). **Nicotinic Acid Storage in the Dog at Different Dose Levels of the Vitamin.**—*J. Nutrit.* **25.** 341–348. **2460**

Test doses of nicotinic acid ranging from 0·1–20 mg. per kg. body weight daily were given over ten-day periods to adult mongrel dogs subsisting on a modified Goldberger (high-maize) diet and exhibiting a well defined deep red area on the inside of the upper lip at the beginning of each test period. The protection afforded against subsequent attacks of "blacktongue" increased logarithmically with the dose up to the 10 mg. level, and it is concluded that limited but definite storage of nicotinic acid, or of some physiological derivative, occurs in the body.—Alastair N. Worden.

Hodson, A. Z., & Loosli, J. K. (1942). **Experimental Nicotinic Acid Deficiency in the Adult Silver Fox.**—*Vet. Med.* **37.** 470–473. **2461**

Nicotinic acid deficiency was set up in ten adult silver foxes by feeding them on a modified Goldberger (high-maize) diet. Symptoms included inflammatory lesions of the cheek, gums and, more rarely, the tongue, anorexia, gastro-intestinal haemorrhage, and collapse. Complete recovery was brought about in five cases by oral administration of nicotinic acid before the stage of collapse had been reached. The benzidine test for blood in the faeces became positive before clinical symptoms were manifested.—Alastair N. Worden.

Gavin, G., Patterson, J. M., & McHenry, E. W. (1943). **Comparison of the Lipotropic Effects of Choline, Inositol, and Lipocaic in Rats.**—*J. biol. Chem.* **148.** 275–279. **2462**

It had previously been reported that inositol would prevent the development of the high cholesterol content type of fatty liver induced in rats by the feeding of biotin. In the present paper, it is stated that lipocaic but not choline has a similar action. Lipocaic, choline, and inositol were all found to prevent fatty livers resulting from the feeding of a fat-free diet containing cholesterol. Choline and inositol, but not lipocaic, were found to prevent fatty livers resulting from the feeding of a high-fat diet containing cholesterol. Inositol did not prevent the fatty livers resulting from feeding vitamin B_1, against which choline has previously been described as protective.—Alastair N. Worden.

Richardson, L. R., Hogan, A. G., & Miller, O. N. (1942). **The Relation of Biotin to Perosis in Chicks.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 343. pp. 10. **2463**

White Leghorn chicks which received a sucrose, casein, gelatin, lard, and mineral diet, supplemented with vitamins A, D, E, K, and all the chemically identified members of the B complex except biotin, developed dermatitis in all, and perosis in a high percentage, of cases within about 28 days. When raw egg-white was used as a source of protein, perosis developed in 8–14, and dermatitis in about 28 days. The dermatitis could be prevented completely, and the perosis mitigated, by daily intramuscular or intraperitoneal injections of 2–5 μg. of biotin per bird. When heated egg-white was used, and 1 μg. of biotin given daily by mouth, the dermatitis, but not the perosis, was prevented.
—Alastair N. Worden.

Christensen, K. (1942). **Renal Changes in the Albino Rat on Low Choline and Choline-Deficient Diets.**—*Arch. Path.* **34.** 633–646. **2464**

Histological examinations were made of the kidneys of the rats studied by Griffith [see *V. B.* **12.** 231]. In acute deficiency, the primary vascular change was congestion of the peripheral cortical capillaries, capsular vessels, and, sometimes, glomerular vessels. Tubular hyaline casts were abundant, and in severe cases there was calcification of degenerated peripheral tubules. In recovered cases, regeneration began in 7–10 days and was remarkably efficient. Chronic deficiency was characterized by reduction in glomerular size, chronic granular degeneration, and tubular dilation.—A. N. W.

Wright, L. D., & Welch, A. D. (1943). **The Role of "Folic Acid" and Biotin in the Utilization of Pantothenic Acid by the Rat.**—*Science.* **97.** 426–427. **2465**

The growth-depressant effect of succinylsulphathiazole, and its counteraction with biotin + "folic acid" are explained in terms of pantothenic acid utilization. The addition of succinylsulphathiazole to a highly purified diet led not only to cessation of growth in rats, but also to symptoms indicative of pantothenic acid deficiency and to low liver pantothenic acid contents.

It is suggested that biotin and "folic acid" are essential for the utilization of pantothenic acid, and that their normal intestinal synthesis is inhibited by succinylsulphathiazole.—Alastair N. Worden.

Briggs, G. M., Jr., Luckey, T. D., Elvehjem, C. A., & Hart, E. B. (1943). **Studies on Two Chemically**

Unidentified Water-Soluble Vitamins Necessary for the Chick.—*J. biol. Chem.* **148.** 163–172. **2466**

Day-old White Leghorn chicks were provided with a synthetic diet supplemented with vitamins A, D, E, K, B_1, and B_6, riboflavin, nicotinic acid, pantothenic acid, inositol, choline and biotin. Growth and feathering were poor. Some improvement was noted when supplements containing "folic acid" were added to the diet, but whether "folic acid" itself was responsible could not be decided. Two fractions obtained from liver and other materials were found to improve feather development and growth respectively. The fractions were both water soluble, and could be adsorbed on norite at pH 3 and eluted with a water-alcohol-ammonia mixture. Partial separation was obtained by fractional precipitation with alcohol. The tentative names of vitamins B_{10} (feather factor) and B_{11} (growth factor) are proposed for the active factors in the two fractions, which are distinct from "folic acid" and from the eight chemically identified B vitamins listed above.—ALASTAIR N. WORDEN.

KODICEK, E., & MURRAY, P. D. F. (1943). **Influence of a Prolonged Partial Deficiency of Vitamin C on the Recovery of Guinea Pigs from Injury to Bones and Muscles.**—*Nature, Lond.* **151.** 395–396. **2467**

In order to test the effect of a combined deficiency of vitamins C and D on re-opening of healed fractures, groups of g. pigs were put on diets with a partial deficiency of vitamin C, an almost complete deficiency of vitamin D, or both deficiencies together. A control group received a complete diet. On the 14th day, one fibula of each animal was fractured with special forceps. No re-opening of healed fractures was observed, but other interesting results were obtained. In the vitamin C deficient animals, whether deficient in vitamin D or not (no evident rickets appeared in the D-deficient groups), there was in many cases a very marked overgrowth of subperiosteal bone of a histologically inferior type in the injured bones, together with a typical scorbutic porosis of the original bone. Many animals in the two vitamin C deficient groups also showed a swelling of the leg muscles concerned, involving an overgrowth of the inter- and intramuscular connective tissues, and an immobilization, possibly ankylotic, of the associated knee joint.

These changes appeared in limbs recovering from injury in animals subjected to a mild deficiency of vitamin C which was not sufficient to cause any external sign of scurvy other than retarded growth.—D. G. G.

*SEEKLES, L. (1940). Über das Vorkommen und die Natur glykogenolytischer, antiketogener, hyperglykämischer, ketogener und antihyperglykämischer Prinzipien im Blutserum bei vegetativ-endokriner Störung (Paresis puerpalis des Rindes) im Vergleich mit dem Puerperium. **[Occurrence and Nature of Glycogenolytic, Antiketogenic, Hyperglycaemic, Ketogenic, and Anti-Hyperglycaemic Principles in the Blood Serum in Milk Fever in Cattle in Comparison with the Normal Puerperium].**—*Z. ges. exp. Med.* **108.** 199–206. [Abst. from abst. in *Jber. Vet.-Med.* **68.** 35]. **2468**

S. speculates on the occurrence of the above principles, presumably of pituitary origin, in normal blood and in cases of milk fever and concludes that any differences which can be detected are quantitative rather than qualitative.—ALEX B. PATERSON.

*VANDEPLASSCHE, M. (1941). **[Acetonaemia in Cattle].**—*Vlaam. Diergeneesk. Tijdschr.* **10.** 132–143. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 330]. **2469**

An account of the present knowledge of the causes, effects, and treatments of this disorder.—J. G. CARR.

See also absts. **2474, 2475** (mineral metabolism), **2437** (iodine deficiency), **2471** (calcium and ascorbic acid), **2434** (urea as cattle feed), **2428** (amino acids), **2440** (cholesterol excess), **2491-2493** (vitamin K), **2519** (vitamin B complex), **2541** (vitamin C), **2423-2425** (malnutrition in helminthiasis), **2409** (nutrition of tapeworms).

PHYSIOLOGY AND ANATOMY

—. (1943). **Annual Review of Physiology. Volume V.** [Edited by LUCK, J. M., & HALL, V. E.] pp. viii + 613. Stanford, California: Annual Reviews, Inc. [8vo] [$5.00]. **2470**

This volume appears to maintain the high standard of work found in previous numbers of this series. Some of the subjects reviewed this year are the same as in last year [see *V. B.* **12.** 604.], but there are several new and interesting chapter headings as the following list of contents will show:– Physiological and Pathological Effects of Ultra-violet Radiation, by H. F. BLUM; Physical Properties of Protoplasm, by C. V. TAYLOR; Physiological Aspects of Genetics, by J. SCHULTZ; Developmental Physiology, by W. F. WINDLE; Physiology of Bone, by F. C. MCLEAN; Energy Metabolism, by E. B. FORBES & L. VORIS; The Respiratory System, by C. L. GEMMILL; Muscle, by E. FISCHER; The Digestive System, by R. C. HERRIN; Blood, by H. D. BRUNER; The Lymphatic System, by P. D. MCMASTER; Heart, by F. D. JOHNSTON & F. N. WILSON; Nerve and Synaptic Transmission, by B. RENSHAW; Visceral Functions of the Nervous System, by H. W. MAGOUN; Temperature Regulation, by L. P. HERRINGTON & A. P. GAGGE; Liver and Bile, by J. L. BOLLMAN; Sense Organs, by H. DAVIS & S. H. BARTLEY; Metabolic Functions of the Endocrine System, by B. A. HOUSSAY & V. DEULOFEU; Physiology of Mammalian Semen, by J. MACLEOD; Endocrinology of Reproduction, by C. A. PFEIFFER; Physiological Psychology, by N. CAMERON & H. F. HARLOW; Biological Assay, by C. I. BLISS & M. CATTELL.

Each chapter contains many references to original papers and good subject and author indexes are given. —R. ALLCROFT.

REID, M. E. (1943). **Interrelations of Calcium and Ascorbic Acid to Cell Surfaces and Intercellular Substances and to Physiological Action.**—*Physiol. Rev.* **23.** 76–99. **2471**

The nature of cell surface material and intercellular substances in animal and plant tissues and the possible part played by calcium and ascorbic acid in their formation and maintenance are discussed. An analogy is drawn between the intercellular cement substance in animals which is mucoid in nature and the intercellular middle lamella of plants which is chiefly calcium pectate. Ca deficiency seems to have an injurious effect upon intercellular substance in multicellular organisms and on cell membranes in unicellular types. Ascorbic acid deficiency is also considered by some workers to affect adversely the stability of cementing substances, but others consider that its effect is upon the cells themselves. Various evidence is brought forward to suggest a parallelism between Ca and ascorbic acid activity, as for instance their activity in promoting growth, in affecting water balance, in decreasing tissue permeability, and in stimulation of muscle tissue.

The suggestion is advanced that there is some interrelationship between the metabolic functions of Ca and of ascorbic acid which R. believes may have some connexion with activity at the cell surface.—R. McA.

PATT, H. M., & LUCKHARDT, A. B. (1942). **Relationship of a Low Blood Calcium to Parathyroid Secretion.**—*Endocrinology.* **31.** 384–392. 2472

A low level of blood serum calcium in dogs, brought about by transfusion with decalcified blood, rose again within 30 min. The effect was similar if the animals had been thyroparathyroidectomized immediately before the experiment. Since in dogs with low blood Ca due to injection of oxalate, parathyroidectomy prevented the return of Ca to levels observed in normal controls after 1·5–3·5 hours, the previous negative finding was thought to be due to the short period of observation.

Decalcified blood, which had been perfused through a thyroid-parathyroid preparation, when injected into normal dogs, caused a notable increase in serum Ca. Normal blood treated in the same way caused no rise in serum Ca on injection. The implication of these results is taken to be that low blood Ca stimulates secretion by the parathyroid gland of a substance which itself will cause a rise in blood Ca.—R. McANALLY.

GREENBERG, D. M., COPP, D. H., & CUTHBERTSON, E. M. (1943). **Studies in Mineral Metabolism with the Aid of Artificial Radioactive Isotopes. VII. The Distribution and Excretion, Particularly by way of the Bile, of Iron, Cobalt, and Manganese.**—*J. biol. Chem.* **147.** 749–756. [For previous parts, see *V. B.* **11.** 907]. 2473

Radioactive isotopes of iron, cobalt and manganese were administered to rats by injection and by the mouth, and the distribution of these elements in the bile (collected through an artificial gall bladder type of fistula), urine, faeces and liver was studied. All three elements were poorly absorbed when given by the mouth. Injected Fe was largely retained in the body. Injected Co was mainly excreted in the urine but a significant amount appeared in the bile. Mn was very largely excreted in the bile. The latter two elements accumulated in the liver. Small quantities of Mn passed into the milk of a lactating female.—R. McA.

EDGAR, G. (1942). **Experiments on Copper Storage in the Liver of Sheep. I. The Effect of Increased Iron, Cobalt and Manganese Intake.**—*Aust. vet. J.* **18.** 28–31. 2474

The investigational work on enzootic jaundice of sheep in south-eastern Australia has revealed that this condition is closely associated with a high storage of copper in the liver and its subsequent release into the circulating blood, leading to a fatal haemolytic jaundice. In an endeavour to determine whether increased supplements of cobalt, manganese, and iron salts would have any effect in reducing Cu stored in the livers of sheep which were being given an extra 25 mg. Cu per day, daily dosings of salts of these metals were given to groups of sheep.

The results obtained suggested that when the daily Cu intake is raised by as little as 25 mg., the amount of Cu stored in the liver can rise, within 228 days, to high levels comparable with those found in cases of enzootic jaundice, but administration of additional Co, Mn, or Fe had no significant influence on this rise in liver Cu content.—M. C. FRANKLIN.

KATO, K., & IOB, V. (1940). **Influence of Cobalt on Iron Transportation and Storage: A Chemical and Histologic Study.**—*Amer. J. clin. Path.* **10.** 751–766. 2475

In order to investigate iron transport in the blood and iron storage in organs, experimental polycythaemia was produced in dogs and rabbits by simultaneous administration over a period of months of ferric ammonium citrate and cobaltous sulphate. A rise in total Fe of the blood was detected which was in part due to increased haemoglobin, but a non-haemoglobin iron fraction was also increased. For the histological demonstration of Fe storage in the organs, Fe and Co either alone or in combination were administered to rabbits subsequently killed by intravenous injection of air. Observations showed that storage of exogenous Fe takes place first in the liver, but is then transferred to the spleen and bone marrow; the latter effect was not seen when Co was given together with Fe. Because of this it is suggested that Co enables Fe to be more completely utilized for haemopoiesis than when Fe is given alone.—R. McANALLY.

DEICHMANN, W., & SCHAFER, L. J. (1942). **Phenol Studies. I. Review of the Literature. II. Quantitative Spectrophotometric Estimation of Free and Conjugated Phenol in Tissues and Fluids. III. Phenol Content of Normal Human Tissues and Fluids.**—*Amer. J. clin. Path.* **12.** 129–143. 2476

The differences in specificity in methods of estimation of phenol are critically reviewed and it is emphasized that data on the physiological behaviour of phenol as well as on the retention and excretion of free and conjugated phenol are significant only if the analytical methods used are specific for these compounds. A method of estimation of free and conjugated phenols in fluids and tissues is suggested, the final determination of phenol being made spectrophotometrically. Data of the phenol content of tissues and fluids from normal human beings are given. Results obtained by other investigators including data from man, horses, dogs, rabbits, and rats are tabulated and discussed.—R. A.

HOGEBOOM, G. H., & ADAMS, M. H. (1942). **Mammalian Tyrosinase and Dopa Oxidase.**—*J. biol. Chem.* **145.** 273–279. 2477

A transplantable melanoma from a mouse was used as a source of melanin-producing enzymes for investigation of the nature of these enzymes. Experiments showed that the tumour contained enzymes which catalyse the oxidation of both tyrosine and dihydroxyphenylalanine (dopa) to melanin. The presence of one of these enzymes, dopa oxidase, has been demonstrated in normal mammalian skin [see MEIROWSKY and ANON. —*V. B.* **11.** 564.], but the other enzyme, a tyrosinase, has not previously been definitely demonstrated in mammalian tissue.—R. ALLCROFT.

TRAUTMANN, A., & KIRCHHOF, H. (1940). Zur physiologischen Bedeutung des Kolonlabyrinthes des Schweines. [**Physiological Significance of the Labyrinth of the Colon of the Pig**].—*Dtsch. tierärztl. Wschr.* **48.** 650–653. 2478

Observations were made on the faecal composition of two sib pigs, one of which was subjected to operation by which nearly all the colon labyrinth was excluded from the intestinal tract. It was found that the faeces of the test pig after operation contained less dry matter, less ash and more raw fibre, from which it is assumed that the colon labyrinth is concerned with the absorption of water, excretion of inorganic substances, and digestion of fibre.—J. E.

KRULL, W. H. (1943). **Coprophagy in the Wild Rabbit, *Sylvilagus nuttallii grangeri* (Allen).**—*Vet. Med.* **38.** 72. 2479

K. examined the droppings of rabbits from a certain area for evidence of *Fasciola hepatica* infection, in an attempt to explain the scarcity of rabbits in the

area. During collections after snowfalls, many rabbits' tracks but few droppings were noted, but only where *S. nuttallii grangeri* was the rabbit concerned. In five of these rabbits the stomach was distended with pellets rendered polyhedral by pressure. K. suggests the origin of this "habit" of coprophagy may have been to conserve food and moisture in arid regions.—C. V. W.

GUNN, R. M. C., SANDERS, R. N., & GRANGER, W. (1942). **Studies in Fertility in Sheep. 2. Seminal Changes affecting Fertility in Rams.**—*Bull. Coun. sci. industr. Res. Aust.* No. 148. pp. 140. [For part I, see *V. B.* **5.** 384]. **2480**

An abstract cannot do justice to the information contained in this bulletin. It includes observations on seasonal variations in the semen characters of rams in western New South Wales, and describes experiments carried out under conditions similar to those present in the field, but artificially produced in a "conditioned" building. For comparative purposes, methods of numerically expressing the characters of spermatozoa have been developed.

Seminal degeneration has been studied in relation to climatic, nutritional, and disease conditions. Dipping in arsenical dips has produced seminal degeneration.

Common clinical abnormalities in rams are described and illustrated and their incidence is recorded. Associated seminal changes are described. Experimental matings and breeding records have been used to show the relationship of the seminal picture to fertility.

A method of predicting seasonal fertility in rams from data of pasture conditions and atmospheric temperatures is described. It is based on observations that seminal degeneration occurs about six months after all greenness is lost from pastures and about four months after the beginning of a period of sustained maximum daily temperatures above 90°F., and that regeneration after marked degenerative changes is not complete until about two months after unfavourable conditions have ceased to operate.

Experiments, methods, and apparatus are fully described and illustrated. All those who are interested in fertility should see the original publication.

—H. McL. GORDON.

WRIGHT, J. G. (1943). **Parturition in the Mare. Report based on Observations made in Nine Normal Cases.**—*J. comp. Path.* **53.** 212–219. **2481**

A careful description of the phenomena preceding, during, and following parturition in the mare. Mammary hypertrophy became visible at 30–14 days before parturition. The earliest at which "waxing" of the teat orifice was observed was 48 hours, and the latest nine hours before the onset of parturition. The vulval labia did not become tumefied, as in the cow, nor was there any relaxation of the pelvic ligaments at the approach of parturition. The vaginal mucous membrane and the cervical canal remained "dry" and sticky until the onset of labour. Duration of gestation in the eight Suffolk mares observed ranged from 317–363 days. A carefully documented description of the three stages of labour is given. The first lasted 1-4 hours, and the second 9–70 min., but in six of the nine parturitions observed it was 30 min. or less. In the third stage, the period elapsing between birth of the foetus and expulsion of the foetal membranes, there was marked variation. In only one did the membranes come away immediately after birth of the foal; in the others they were retained for approximate periods varying from ½–21 hours. W. considers that manual removal of the membranes should not be resorted to until 24 hours have elapsed. Pituitary extract was found to be of no value as an aid to expulsion of the membranes. In four out of five foetal membranes examined, the allantois-chorion was completely inverted when expelled, *i.e.* with the allantoic surface outermost.

—N. J. SCORGIE.

SMITHCORS, J. F., & LEONARD, S. L. (1942). **Relation of Thyroid to Mammary Gland Structure in the Rat with Special Reference to the Male.**—*Endocrinology.* **31.** 454–460. **2482**

In both normal and castrated male rats, thyroidectomy produced an inhibition of mammary duct growth and a stimulation of the lobular-alveolar system. When treated with α-oestradiol dipropionate, thyroidectomized castrated males showed very poor duct extension but very good lobular-alveolar development. Treatment with testosterone propionate produced identical results. Thus thyroidectomy abolished the characteristic duct extension normally produced by oestrogens in the male castrated rat, and accentuated the stimulation of the lobular-alveolar system in the testosterone-treated male castrated rat. This unusual effect is discussed, but cannot at present be completely explained and requires further investigation.—ALFRED T. COWIE.

MIXNER, J. P., BERGMAN, A. J., & TURNER, C. W. (1942). **Relation of Mammogenic Lobule-Alveolar Growth Factor of the Anterior Pituitary to Other Anterior Pituitary Hormones.**—*Endocrinology.* **31.** 461–466. **2483**

A group of anterior pituitary materials and extracts ranging from fresh cattle anterior pituitary to highly purified lactogenic, thyrotropic, and gonadotropic extracts, were assayed for their properties in promoting mammary lobule-alveolar growth, ovariectomized oestrogen-treated mice being used as test animals. Most of the materials were also assayed for lactogenic activity and a few for their thyrotropic and gonadotropic activity. The comparative assays indicated that the lobule-alveolar growth factor was distinct from the lactogenic, thyrotropic, and gonadotropic factors, although the probability that other pituitary factors might synergise with the lobule-alveolar growth factor was not ruled out.—ALFRED T. COWIE.

MENKIN, V. (1942). **Further Studies on Effect of Adrenal Cortex Extract and of Various Steroids on Capillary Permeability.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 39–41. **2484**

The increase in tissue permeability, as shown by diffusion into the tissues of trypan blue injected intravenously, caused by injecting inflammatory exudate or its purified active principle, leucotaxine, was inhibited by the simultaneous injection of extract of adrenal cortex [see also *V. B.* **11.** 649]. A number of compounds of the sterol type derived from the adrenal cortex showed a similar but lesser effect when they were dissolved in an oil, but none if they were suspended in saline or serum.—R. MCANALLY.

DAVIDSON, J. N. (1943). **Wound Hormones.**—*Edinb. med. J.* **50.** 70–84. **2485**

A critical examination is made, from the biochemical point of view, of the evidence put forward for the existence of the so-called "wound hormones". It appears to be reasonably certain that injured cells do set free chemical substances as a result of the breakdown of their own protoplasm and that these substances may, under suitable circumstances, stimulate tissue growth and so aid regeneration; but whether any of them are synthesized *ad hoc* by the injured cells or whether they are merely products of protein or nucleoprotein breakdown with general nutritive properties, is not clear. In the case of plants, it is known that wound hormones exist and the substance responsible has been identified

as "traumatic acid". The work of LOOFBOUROW *et al.* [*V. B.* **13.** 329.] and of D. has shown that injured yeast cells produce nitrogenous materials containing protein degradation products and nucleic acid derivatives of the pentose nucleotide type. These substances stimulate the growth of fresh yeast cells, but it is not yet certain whether they are produced as a specific response to injury or are merely degradation products of dead and dying cells.

There is also some evidence that injured animal tissues are the source of a factor, or factors, which accelerate tissue proliferation and the healing of secondary wounds, but nothing definite is known about the nature of these substances.—R. ALLCROFT.

See also absts. **2365** (blood picture of horses), **2352** (blood proteins), **2442** (capillary permeability), **2443** (pituitary gland), **2429** (steroid hormone excretion).

POISONS AND POISONING

FOUTS, P. J., & PAGE, I. H. (1942). **The Effect of Chronic Lead Poisoning on Arterial Blood Pressure in Dogs.**—*Amer. Heart J.* **24.** 329–331. **2486**

The administration of lead acetate to a dog in sufficient quantity to produce acute attacks of lead poisoning did not increase arterial blood pressure.
—R. MCANALLY.

MORAES MELLO, E. M., & SAMPAIO FERNANDES, J. (1940). Contribuição ao estudo das plantas tóxicas brasileiras. [**Poisonous Plants of Brazil**]. pp. 50. Rio de Janeiro: Departmento Nacional da Produção Animal, Ministério da Agricultura. [8vo]. **2487**

The authors discuss poisoning of animals by *Palicourea* spp., pointing out that death due to these plants is sometimes mistaken for anthrax when only a partially decomposed body is available for examination, and that this has led some owners to doubt the efficiency of vaccination against anthrax. The occurrence and habitats of these plants (as given in MARTIUS' "Flora Brasiliensis") are listed. The toxic action of *P. longepedunculata* was found to be due to a high saponin content.—J. G. CARR.

ANGULO, J. J. (1942). Un aporte a la controversia sobre el principio tóxico del curamaguey o bejuco marrullero. (Urechites Lutea (L) Britton). [**Poisoning by the Toxic Principle of "Curamaguey"**—*Urechites lutea* **(L.) Britton**].—*Rev. Med. trop. parasit., Habana.* **8.** 47–49. **2488**

An outbreak of poisoning in farm animals, characterized by decreased secretions, dilated pupils, impaired sensation, weakness of the forelegs, and sudden death after exertion, was believed to be due to the ingestion by the animals of "curamaguey". It had been suggested that the toxic principle was atropine, but chemical, pharmacodynamic, and biological tests tended to disprove this. Moreover, the plant belongs to the family Apocynaceae, and no records exist of the presence of atropine in any member of this family.

It was shown that extracts of the plant have actions on the animal body similar to those of digitalis. Three glucosides, urequitine, urequitoxin, and amorphous urequitoxin have already been isolated from "curamaguey".—ISOBEL W. BURTON.

PACE, N., & MACKINNEY, G. (1941). **Hypericin, the Photodynamic Pigment from St. John'swort.**—*J. Amer. chem. Soc.* **63.** 2570–2574. **2489**

It is known that certain domestic animals are affected by photosensitization after grazing on St. John's wort (*Hypericum perforatum*) due to ingestion of the pigment hypericin, which occurs as a semi-solid mass in black dots which are scattered over the surfaces of the leaves, stems, and petals of the plant. The method of extraction and isolation of the photodynamic pigment is described, and, from an examination of its properties, it is suggested that hypericin is a partially reduced polyhydroxy derivative of helianthrone.—R. ALLCROFT.

PACE, N. (1942). **The Etiology of Hypericism, A Photosensitivity Produced by St. Johnswort.**—*Amer. J. Physiol.* **136.** 650–656. **2490**

A red fluorescent pigment has been isolated from St. John's wort and on feeding rabbits with the plant, the pigment was identified spectroscopically in the skin and various tissues. The pigment produced typical photosensitization when given *per os* to rats. It is therefore concluded that the pigment, hypericin, is responsible for the photosensitization of animals after ingestion of St. John's wort.—G. D. S.

OVERMAN, R. S., STAHMANN, M. A., & LINK, K. P. (1942). **Studies on the Hemorrhagic Sweet Clover Disease. VIII. The Effect of 2-Methyl-1, 4-Naphthoquinone and *l*-Ascorbic Acid upon the Action of 3,3′-Methylenebis (4-Hydroxycoumarin) on the Prothrombin Time of Rabbits.**—*J. biol. Chem.* **145.** 155–162. [For parts VII & IX, see *V. B.* **12.** 608]. **2491**

BAUMANN, C. A., FIELD, J. B., OVERMAN, R. S., & LINK, K. P. (1942). **Studies on the Hemorrhagic Sweet Clover Disease. X. Induced Vitamin C Excretion in the Rat and its Effect on the Hypoprothrombinemia Caused by 3,3′-Methylenebis(4-Hydroxycoumarin).**—*Ibid.* **146.** 7–14. **2492**

LINK, K. P., OVERMAN, R. S., SULLIVAN, W. R., HUEBNER, C. F., & SCHEEL, L. D. (1943). **Studies on the Hemorrhagic Sweet Clover Disease. XI. Hypoprothrombinemia in the Rat Induced by Salicylic Acid.**—*Ibid.* **147.** 463–474. **2493**

VIII. Experiments on rabbits showed that the simultaneous oral administration of *l*-ascorbic acid and 2-methyl-1,4-naphthoquinone at high levels with the haemorrhagic agent 3,3′-methylenebis(4-hydroxycoumarin) either drastically reduced or completely prevented the hypoprothrombinaemia which is produced by this substance. When the rabbits were maintained on a grain and alfalfa diet over the entire experimental period, the anticoagulant action of 3,3′-methylenebis(4-hydroxycoumarin) was also reduced but not as drastically as when *l*-ascorbic acid + 2-methyl-1,4-naphthoquinone (a substance having vitamin K activity) were given. A moderate but definite alleviation of the extent and duration of the hypoprothrombinaemia was also caused by oral administration of 2-methyl-1,4-naphthoquinone. Simultaneous administration of vitamin C and the anticoagulant substance had no effect on the resultant hypoprothrombinaemia in some rabbits, but in others less susceptible to the anticoagulant, vitamin C prevented the usual increase in prothrombin time. It is pointed out that the levels of the two vitamins necessary to exert an antagonistic action on the anticoagulant substance are much higher than those required to avoid a dietary deficiency. The possible relationships of the two vitamins to the anticoagulant are discussed.

X. Investigations were carried out on the effect of *l*-ascorbic acid and of compounds which increase the excretion of vitamin C on hypoprothrombinaemia, induced by ingestion of 3,3′-methylenebis(4-hydroxycoumarin), in rats maintained on a basal diet of either sweetened condensed milk or artificial concentrates. Administration of *l*-ascorbic acid had no effect on the hypoprothrombinaemia in rats on either of the basal diets. When chloretone, carvone, theobromine, and

other compounds which stimulate the excretion of vitamin C in rats on a condensed milk diet, were fed for 7–16 days the degree of hypoprothrombinaemia induced by 3,3′-methylenebis(4-hydroxycoumarin) was markedly lowered; the degree of protection was roughly proportional to the output of vitamin C in the urine, *i.e.* compounds which stimulated the greatest excretion of the vitamin counteracted the anticoagulant most effectively. Also carvone and chloretone prolonged the lives of rats ingesting the anticoagulant daily. Administration of the anticoagulant alone caused a temporary increase in the excretion of vitamin C by rats on the condensed milk diet, but this increase did not occur in the rats on the artificial basal diet. The maximum effect was observed 6–9 hours after ingestion of the anticoagulant but repeated doses of the anticoagulant, unlike the compounds such as chloretone and carvone, resulted in a decrease of excreted vitamin C. An increase in the vitamin C content of the blood was observed after ingestion of the anticoagulant, but no significant changes were observed in the vitamin C content of other tissues. The possible relationship of vitamin C to prothrombin is discussed.

XI. It was previously shown [see HUEBNER & LINK—*V. B.* **12.** 240.] that degradation of 3,3′-methylenebis(4-hydroxycoumarin) yielded salicylic acid. It is now demonstrated that when single doses of salicylic acid are administered either orally or intravenously to rats maintained on a basal artificial ration low in vitamin K, a temporary hypoprothrombinaemia is produced comparable in all respects to that caused by 3,3′-methylenebis(4-hydroxycoumarin). Addition of vitamin K in the form of 2-methyl-1,4-naphthoquinone or maintenance on a grain ration containing vitamin K prevents the hypoprothrombinaemia produced by salicylic acid. This hypoprothrombinaemia can only be induced with difficulty in those species (*i.e.* the rabbit and dog) in which avitaminosis K cannot be induced readily but it has been reproduced in man even on an unrestricted diet. The salicylic hypoprothrombinaemia, however, has been readily induced in dogs whose livers have been injured through prolonged chloroform anaesthesia. There is a considerable difference in the detectable dose of the two substances, *e.g.* 50 mg. or more of sodium salicylate are required to produce a state of hypoprothrombinaemia comparable to that produced by 2·5 mg. of 3,3′-methylenebis(4-hydroxycoumarin); also the maximum effect of a single dose of sodium salicylate is attained much more quickly and is of much shorter duration than that of 3,3′-methylenebis(4-hydroxycoumarin). The relationship is discussed of these observations to some of the long-standing contra-indications reported in the therapeutic use of salicylates.

—R. ALLCROFT.

LEWIS, K. H., HAM, W. E., & JENSEN, W. I. (1943). **Influence of Vitamins and Coliform Bacteria on Sulfaguanidine Tolerance by Young Chickens.**—*Proc. Soc. exp. Biol., N.Y.* **52.** 33–35. **2494**

Sulphaguanidine fed daily at levels of 3–5% of the body weight of baby chicks was rapidly fatal; levels of 1–2% retarded growth and caused some mortality. When a vitamin mixture (*p*-aminobenzoic acid, thiamine, and riboflavin), or a suspension of *Bacterium coli* was fed at the same time as a 1% dose of sulphaguanidine, the death rate was more than double that caused by the 1% sulphaguanidine alone: control birds given the vitamins remained healthy. Sulphaguanidine also reduced the faecal coliform bacteria count very considerably, and the vitamin mixture but not the *Bact. coli* reversed this inhibitory effect.

It is concluded that the activities of intestinal coliform bacteria, possibly in connexion with the synthesis of vitamins, play some part in the tolerance of sulphaguanidine by young birds.—D. G. GILMOUR.

BYWATER, H. E. (1942). **Copper Sulphate Tolerance of Sheep.**—*Vet. Rec.* **54.** 380. **2495**

A brief report is given of the not only non-harmful, but extremely beneficial, effect of a double dose of $CuSO_4$ on 100 lambs which showed the usual clinical symptoms of parasitic gastritis. Ten of the poorest lambs were folded and given a full dose of phenothiazine with little or no subsequent improvement. Owing to an error in dilution the whole flock was then given a 2% solution of $CuSO_4$ instead of a 1%, so that each lamb received approximately 29 grains of the drug. Within an hour of dosing the animals passed large numbers of tapeworms with subsequent rapid recovery and improvement in condition. It is pointed out that $CuSO_4$ alone appears to be well tolerated by sheep.

—R. ALLCROFT.

I. PYBUS, J. (1943). **Nicotic Poisoning in Cattle.—Case Record No. I.**—*Vet. Rec.* **55.** 243. **2496**

II. JONES, T. H., & JOHN, F. V. (1943). **Nicotine Poisoning in Cattle. Case Record No. II.**—*Ibid.* 243–244. **2497**

I & II. These are case records of poisoning of cattle following the application of nicotine sulphate which was applied together with hydrated lime in a Government-approved formula as an ox-warble larvicide. Symptoms, which appeared within a few minutes after dressing, included staggering followed by paralysis, convulsions, and signs of shock. The animals described in I all recovered after receiving stimulants, as well as all but four of those described in II which were slaughtered at the height of the poisoning syndrome.

—J. E.

FISTLER, R. P. (1942). **Toxic Results from Phenothiazine.**—*Vet. Student, Iowa.* **5.** 74. **2498**

A herd of 64 young pigs, each weighing about 35 lb., was drenched with phenothiazine, each animal being given 12·5 g. The following day about a third of the animals exhibited weakness or paralysis of the hind-quarters, associated with anaemia, symptoms which are typical of phenothiazine intoxication in pigs. By the second day all the affected pigs had improved, except that some appeared to be blind; complete recovery was attained in a few days. [A review of the literature concerning phenothiazine (see *V. B.* **12.** R7–R14.) emphasized strict adherence to the minimum adequate anthelmintic dose, particularly in the treatment of young pigs, calves, and horses. The minimum adequate dose for pigs is about 0·2 g. per lb. body weight; the dose in these experiments was about 0·35 g. per lb. body weight.]—D. G. DAVEY.

LAPAGE, G. (1943). **The Effects of Phenothiazine on Young Pigs.**—*Vet. Rec.* **55.** 184–186. **2499**

This article includes a comprehensive review of the experiments in which phenothiazine was administered to pigs, and an account of L.'s own work on the subject. His main conclusions are as follows. (a) When pigs aged 12 weeks, with an average weight of 35 lb., were given phenothiazine by mixing the total dose for the group with the food, some of them showed toxic effects from doses as low as 0·2 g. per lb. live weight. But pigs three weeks younger than this, and about the same weight, had been given in their food doses gradually increasing to 1·0 g. per lb. without ill effects. (b) When 1 g. of phenothiazine per lb. live weight was given by stomach tube to pigs aged eight weeks and weighing 16–21½ lb., only one of 19 pigs showed toxic effects and these were transient. (c) L. concludes, therefore, that the responses of individual pigs to phenothiazine, whatever the dose and whatever the age of the pigs, are erratic and incalculable. [This statement, however,

may be an exaggeration because experiments were not done on pigs older than 4½ months.]—D. G. DAVEY.

I. EDWARDS, J. E., & DALTON, A. J. (1942). **Induction of Cirrhosis of the Liver and of Hepatomas in Mice with Carbon Tetrachloride.**—*J. nat. Cancer Inst.* **3.** 19–41. **2500**

II. EDWARDS, J. E., HESTON, W. E., & DALTON, A. J. (1942). **Induction of the Carbon Tetrachloride Hepatoma in Strain L Mice.**—*Ibid.* 297–301. **2501**

I. Hepatomas were found in 88% of mice dosed 23–58 times with 0·04 ml. of CCl_4 in olive oil and autopsied at one year of age or less. Spontaneous hepatomas appeared in 0–27% of untreated controls of the same strains, and repeated dosage with olive oil did not increase the incidence. Single or limited numbers of doses of CCl_4, even at high levels sufficient to cause hepatic necrosis, did not increase the incidence.

II. The technique used was similar to that described in I, a total of 46 treatments being given. The incidence of hepatomas was 46% in animals first treated at 2-7 months of age, but only 1·3% in those in which treatment was postponed until the second year of life.
—ALASTAIR N. WORDEN.

FORBES, G. (1943). **Tetrachlorethane Poisoning.**—*Brit. med. J.* March 20th. 348–350. **2502**

Tetrachlorethane is sold under various trade names as "westron", "alanol", "emaillet", and "cellon" and has a large variety of industrial uses, mainly as a solvent. Amongst other things it is used as a parasiticide, especially as a hair wash for dogs, perfumed substances being added. It is a dangerous agent in industry because of the extent to which personnel become poisoned. It can be absorbed from the alimentary canal or, following inhalation, through the lungs; also, enough may be absorbed through the skin to produce complete narcosis. It is excreted largely through the lungs, but partly through the urine. It is generally considered to be the most toxic of the chlorinated hydrocarbons, and is 2½–3½ times more toxic than chloroform. Death in acute cases is brought about by narcotic action on the vital centres, and death supervenes so quickly that no effect on the liver, kidneys, or heart, of the kind seen in fatal cases of chronic poisoning by inhalation of the vapour, has time to appear. In cases of chronic poisoning the most noteworthy symptoms are malaise, nausea (appearing early), jaundice (appearing later), mental confusion, and delirium; blood changes, particularly an increase of the large mononuclear cells, can be detected before obvious symptoms appear. In fatal cases the liver is reduced in size, and severely affected by fatty degeneration.—D. G. DAVEY.

See also absts. **2540** (lead poisoning), **2432** (food poisoning in mink), **2539** (dicoumarin), **2520-2522** (toxicity of diamidines), **2513** (of sulphonamides), **2530** (non-toxicity of phenothiazine for goats).

THERAPEUTICS AND DISINFECTION

DUBOS, R. J., & HOTCHKISS, R. D. (1942). **Origin, Nature and Properties of Gramicidin and Tyrocidine.**—*Trans. & Studies Coll. Phys. Philadelphia.* **10.** 11–19. **2503**

A good general review of the subject is given, but the subjects discussed have already been dealt with in the *Vet. Bull.*—R. ALLCROFT.

OXFORD, A. E. (1942). **On the Chemical Reactions Occurring between Certain Substances which Inhibit Bacterial Growth and the Constituents of Bacteriological Media.**—*Biochem. J.* **36.** 438–444. **2504**

The bacteriostatic powers of penicillic acid, and of 4-methoxytoluquinone, are diminished by incubation for 1–3 days at 37°C. with sterile broth, or with sterile 1% peptone water at pH 7. Certain simple amines and amino acids such as methylamine, glycine, alanine, and *p*-aminobenzoic acid have a similar effect on penicillic acid; these substances also produce with 4-methoxytoluquinone highly coloured derivatives which are as active antibacterial agents as the original. When heart broth containing peptone is autoclaved with 2% glucose at pH 7·2, destruction of certain compounds occurs which would otherwise react with penicillic acid, diminishing its antibacterial activity.—J. P. GARDNER.

KOHN, H. I., & HARRIS, J. S. (1941). **On the Mode of Action of the Sulfonamides. I. Action on Escherichia coli.**—*J. Pharmacol.* **73.** 343–361. **2505**

HARRIS, J. S., & KOHN, H. I. (1941). **On the Mode of Action of the Sulfonamides. II. The Specific Antagonism Between Methionine and the Sulfonamides in Escherichia coli.**—*Ibid.* 383–400. **2506**

KOHN, H. I., & HARRIS, J. S. (1943). **On the Mode of Action of the Sulfonamides. III. Purines, Amino Acids, Peptones and Pancreas as Antagonists and Potentiators of Sulfonamide in E. coli.**—*Ibid.* **77.** 1–16. **2507**

I. A study was made of the growth and respiration of *Bacterium coli* in different media in the presence and absence of various sulphonamides. There is a latent period of 60–90 min. before the action of sulphonamides on the rate of growth of *Bact. coli* is measurable. Following this, the inhibition develops gradually during the course of three or more hours. Incubation of non-growing cells (growth inhibited by low temperature or by withholding ammonia or glucose) with sulphonamide does not affect the subsequent development of inhibition when growth is initiated. The relationship between rate of growth and drug concentration was determined and found to be simple in a salt-glucose medium, but more complex in one containing proteose peptone. These results indicate that, as the concentration of the drug is raised, the number of reactions inhibited is increased, and that sulphanilamide cannot inhibit some reactions which are sensitive to other sulphonamides (sulphapyridine, sulphathiazole, sulphadiazine). At the bacteriostatically active concentrations studied, the sulphonamides do not primarily inhibit the respiration (per cell) of the resting or growing organism. It is tentatively suggested that sulphonamides inhibit or interfere with the synthesis of substances essential for bacterial growth and multiplication.

II. In further investigations on the hypothesis suggested in I on the mode of action of the sulphonamides, some amino acids and other substances concerned with bacterial nutrition were tested for their antagonistic action on sulphonamides. Methionine was found to antagonize the action of sulphanilamide, sulphapyridine, sulphathiazole, and sulphadiazine on *Bact. coli*. This action is not due to a nonspecific stimulation of growth. Unlike *p*-aminobenzoic acid, methionine is effective only against low concentrations of the sulphonamides. Ethionine, norleucine and norvaline inhibit the growth of *Bact. coli* in simple media but this inhibition is completely overcome by methionine and it is suggested that methionine and ethionine compete for the same locus in the bacterium. The authors suggest that methionine is an antagonist because the sulphonamides, at low concentrations, act primarily by inhibiting the synthesis of methionine. This synthesis is dependent upon the presence of *p*-aminobenzoic acid.

III. The substances present in commercial peptones which affect the activity of sulphonamides (against *Bact. coli*) may be divided into two groups. The first group comprises four amino acids, several purines, and possibly *p*-aminobenzoic acid, and accounts for almost all the antagonism against sulphanilamide. Against sulphathiazole, sulphapyridine and sulphadiazine, however, the first group accounts for almost all the antagonism only when the inhibition of growth is less than about 65%. The second group consists of an antagonist (P2), of great power, which is active at greater inhibitions. The nature of P2 is unknown. It is water soluble but is not a known, naturally occurring amino acid or *p*-aminobenzoic acid. Pancreas seems to be the best source of this agent, though it is neither insulin nor a protein. The actions of P2 are such as to suggest that the heterocyclic sulphonamides either act at more than one locus within the bacterium, or form inactive complexes in the medium.—J. M. ROBSON.

SPELLMAN, J. E. M. (1943). **Sulphonamide Therapy in Mastitis.**—*Vet. Rec.* **55.** 187. **2508**

Streptococcus agalactiae infection, when acute, responds well to sulphonamide P, but the chronic form is not cured without the supplementary infusion with acriflavine after drying off. Sulphonamide is ineffective in the other aetiological types of mastitis, although it is useful in a condition in which the skin of the udder is diffusely thickened and is the site of serum exudation. This is called "wem" in Wales.
—C. V. WATKINS.

MCILWAIN, H. (1942). **Correlation of *in vitro* and *in vivo* Drug Action Through Specific Antagonists: Sulphanilamide and p-Aminobenzoate.**—*Brit. J. exp. Path.* **23.** 265–271. **2509**

It is pointed out that before the *in vitro* action of a drug can be used as a basis of *in vivo* activity, the effect of substances which antagonize the action of the drug must be assessed quantitatively. The *in vitro* interacting quantities of *p*-aminobenzoate and sulphanilamide were investigated, and the *p*-aminobenzoate content of animal materials, such as blood plasma, blood corpuscles, urine, muscle extracts and some bacteriological media was estimated by comparison of opacities due to growth of *Clostridium acetobutylicum* in dilutions of the unknown substances with standards. From the results, the minimal concentration of the drug which should be necessary for action *in vivo* was calculated. This concentration is always obtained in practice.
—M. H. WEDDELL.

—. (1943). **Trade Names of Sulphonamides and Sulphones.**—*Lancet.* **244.** 821. **2510**

A very useful list is given of proprietary names for various sulphonamide and sulphone preparations; sulphonamides without a trade name, *e.g.* sulphadiazine, are not included. This list brings that published by ARDLEY (1941) up to date [see *V. B.* **12.** 395]. It is pointed out that Ardley collected 42 names for sulphanilamide and there are now 54 and the suggestion is made that it is time that the manufacturers sacrificed their trade names for this compound, and perhaps for some others.—R. ALLCROFT.

ALSTRÖM, I. (1942). Sulfonamidterapi hos husdjur. **[Sulphonamide Therapy in Domestic Animals].**—*Skand. VetTidskr.* **32.** 619–630. [English summary]. **2511**

After a general review on sulphonamide therapy, A. gives some Swedish experiences.

In horse practice, it has been found valuable in strangles, puerperal infections, anasarca, bronchopneumonia, pleurisy, etc., lymphangitis, urinary infections, and infected wounds. Results with joint-ill in foals have varied much.

In cattle, favourable results have been secured in septic mastitis and metritis (but not in chronic cases), diplococcal pneumonia, calf pneumonia and diarrhoea, pyelonephritis, actinomycosis, and anaerobic infections.

There has been little experience with its use in pigs:—"transport sickness" in young pigs has responded, but swine erysipelas does not.

With dogs, good results have been recorded in many kinds of nonspecific, acute infections, especially in pneumonia. Distemper responds to serum therapy plus sulphonamide.—J. E.

BRITTON, J. W. (1942). **Sulfanilamide Ointment in Veterinary Surgery.**—*Cornell Vet.* **32.** 345–351. **2512**

B. briefly discusses varying opinions on sulphonamides used locally in human medicine.

In most wounds of large animals, debridement, drainage, and control of bacterial infection are the chief aids to healing by second intention. Local treatment by sulphanilamide ointment (5% in equal parts of lanolin and petrolatum) was found to be more economical than the powder used locally or than oral dosage.

Abscesses, large infected lacerations, and infected operation wounds yielded best to this treatment and B. details 16 such cases. He also refers to certain difficulties in the use of ointments in very hot or very cold weather.

Repeated application is contraindicated after the arrest of the local infection.

Sulphathiazole may be substituted for sulphanilamide in staphylococcal infections.—C. V. WATKINS.

SOBIN, S. S., ARONBERG, L. M., & ROLNICK, H. C. (1943). **The Nature of the Renal Lesion with the Sulfonamides and its Prevention with Urea.**—*Amer. J. Path.* **19.** 211–223. **2513**

The administration by stomach tube of 1–3 mg. of sodium acetylsulphapyridine per g. body weight daily for 7–14 days gave rise in many cases to haematuria, to intrarenal deposition of the drug, and to calculus formation about the site of deposition. These changes could be prevented completely by daily administration of 5–10 mg. of urea per g. body weight.—A. N. WORDEN.

WYSS, O., GRUBAUGH, K. K., & SCHMELKES, F. C. (1942). **Non-Specificity of Sulfonamides.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 618–621. **2514**

The molar ratio of *p*-aminobenzoic acid to sulphonamide required to restore a sulphonamide-inhibited inoculum to half maximum growth was determined, seven bacterial species and six sulphonamide drugs being used. This ratio was found to be constant for a wide range of concentrations of *p*-aminobenzoic acid and sulphonamide and, used as a criterion for the effectiveness of the various sulphonamides, indicated that the efficiency ratios of the drugs were strikingly constant for all the organisms tested. The authors conclude that, in a wide variety of organisms, the receptor site in the bacterial cell is the same, and that the difference in effectiveness between the members of the drug series is a characteristic of the individual sulphonamide, and not of the species of organism involved.—J. L. MCGIRR.

FITZGERALD, R. J., & FEINSTONE, W. H. (1943). **Nature of the Activity of Sulfonamides for the Tubercle Bacillus.**—*Proc. Soc. exp. Biol., N.Y.* **52.** 27–30. **2515**

The bacteriostatic properties of a number of sulphonamides were tested against a laboratory strain of *Bacterium coli* and a rapidly growing, non-pathogenic human strain of *Mycobacterium tuberculosis*, the former being grown on MacLeod's synthetic inhibition-free medium [see *V. B.* **11.** 396.] and the latter on Dorset's

synthetic medium. The results obtained indicated that compounds with a high antibacterial activity for *Bact. coli* possessed a correspondingly high degree of activity against *Mycobact. tuberculosis*, and that their antibacterial activity could be correlated with their acid dissociation constants and their ability to withstand the inhibitory action of *p*-aminobenzoic acid. The authors suggest that their findings constitute evidence in support of the contention of Wyss *et al.* [see preceding abst.] that the antibacterial activities of the sulphonamides are non-specific.—J. Lochiel McGirr.

Martin, F. E. (1943). **Supplemental Report on the Treatment of Streptococcic Mastitis with Tyrothricin.**—*J. Amer. vet. med. Ass.* **102.** 267–268. **2516**

M. reports on the use of tyrothricin on 18 cows in a herd of 28 with 37 quarters shedding long-chain streptococci. It was injected, with aseptic precautions, into infected quarters only, in 20 ml. amounts as a 50% mineral oil emulsion containing 15 mg. of tyrothricin per ml. The injections remained *in situ* until the next milking and were made weekly until there was a negative finding by the incubated film technique [see Little *et al.*—*V. B.* **11.** 714.] applied to quarter samples.

In chronic cases, bi-weekly injections were given during the dry period. A cure of 65% of the cases was obtained. No rule for the pre-selection of these recoveries could be advanced.—C. V. Watkins.

Pittman, M. (1942). **Antibacterial Action of Several Sulfonamide Compounds on *Hemophilus influenzae* Type b[1].**—*Publ. Hlth Rep., Wash.* **57.** 1899–1910. **2517**

When a single dose was used, in protecting mice against type b[1] *Haemophilus influenzae* infection, the activity of the compounds in decreasing order was :– sulphadiazine, sulphathiazole, sulphapyridine, sulphanyl sulphanilamide ; sulphanilamide showed an anti-bacterial action against only one out of six strains. *In vitro* sulphadiazine, sulphathiazole, sulphapyridine and sulphanyl sulphanilamide either markedly retarded growth or killed the bacteria ; sulphanilamide had little effect. The results of treatment with a combination of sulphadiazine (or sulphapyridine) with specific anti-serum seemed to be better than an additive effect of the two agents. Different bacterial strains varied in susceptibility to the action of antiserum. This sensitivity was not correlated with drug sensitivity.

—J. M. Robson.

White, H. J. (1942). **Comparative Activity of Sulfonamides against Coliform Bacteria in the Intestines of Mice.**—*Johns Hopk. Hosp. Bull.* **71.** 213–234. **2518**

A method is described for measuring coliform densities in stool samples by means of a lactose broth dilution count, the same series of tubes being used for both quantitative dilution and for culture of coliform bacteria from standard filtered suspensions. It is also demonstrated that the activity of sulphonamide drugs against the intestinal coliform flora of mice can be determined quantitatively by means of the drug-diet method of treatment ; drug activity is expressed in terms of logarithmic reductions of the geometric mean values for actual numbers of bacteria.

A quantitative comparison of the activity of ten sulphonamide drugs on the basis of equal concentration in the diet and also of drug intake showed that the degree of activity, from high to low, was in the following order :– sulphapyrazine, sulphadiazine, sulphathiazole, N[1] benzoylsulphanilamide, sulphapyridine, N[1] acetyl-sulphanilamide, sulphaguanidine, sulphanilylarsanilic acid, succinylsulphathiazole, and sulphanilamide. The relative *in vitro* activity of these compounds is in qualitative agreement with their *in vivo* activity to the extent that the most active compounds *in vitro* were found to be similarly most active in mice, on the basis of drug intake.

Under the conditions of the experiments described, the anticoliform activity of succinylsulphathiazole, both *in vitro* and *in vivo* was apparently due to the amount of free sulphathiazole present.

Results indicate that the anticoliform activity of drugs may be compared quantitatively by determining for each drug the dosage required to give the same response.—M. H. Weddell.

Davis, G. K., Hale, E. B., & Freeman, V. A. (1943). **Response of Pigs Given Large Doses of Salmonella choleraesuis to Sulfaguanidine, Nicotinic Acid, Thiamin and Pyridoxine.**—*J. Anim. Sci.* **2.** 138–145. **2519**

Sulphaguanidine, at the rate of 1 g. per head per day for three days, overcame the effects of *S. choleraesuis* cultures given by mouth to pigs of 9–10 weeks of age. [See also Cameron—*V. B.* **12.** 511, and Kernkamp & Roepke—*V. B.* **13.** 189.] Nicotinic acid, at the rate of 100 mg. per pig daily, did not influence the reaction of comparable pigs to the culture, but it appeared to assist in promoting recovery [see also Davis *et al.*—*V. B.* **11.** 316]. Vitamins B_1 and B_6 were without effect.—Alastair N. Worden.

I. Wien, R. (1943). **The Pharmacological Actions of Certain Aromatic Diamidines Possessing Trypanocidal Activity.**—*Ann. trop. Med. Parasit.* **37.** 1–18. **2520**

II. Wien, R., Freeman, W., & Scotcher, N. M. (1943). **The Metabolic Effects Produced by Certain Aromatic Diamidines.**—*Ibid.* 19–33. **2521**

I. W. describes the main pharmacological reactions of 4 : 4′diamidino stilbene (stilbamidine), 4 : 4′-diamidino diphenyl ether (phenamidine), 4 : 4′diamidino diphenoxypropane (propamidine), and 4 : 4′diamidino diphenoxypentane (pentamidine). Information is given concerning their toxicity for laboratory animals, and their action is described on the vascular system, heart, respiration, nervous system, and muscles of cats and rabbits. All produce a marked but transient fall in blood pressure (which is antagonized to some extent by calcium) and which appears to be due to a vasodilator effect and not to depression of the heart's activity ; they tend to depress respiration, and in high concentration they stimulate contractions of the smooth muscle of the intestine and uterus.

II. The same four drugs were used in this study. The more important conclusions are as follows. (a) The drugs affected the blood sugar only in doses which approached the toxic level. The main effect was a hyperglycaemia, and phenamidine had the smallest effect. Propamidine was the only compound which was observed to produce a subsequent hypoglycaemic condition. (b) Repeated administration of the diamidines in high doses produced marked depletion of liver glycogen, but this may have been partly due to anorexia. (c) There was an action on the kidneys, demonstrated by an increase in the blood urea and non-protein nitrogen. (d) In dogs and rabbits the serum calcium and potassium levels were both reduced in a few hours. (e) Examination of the blood picture in g. pigs showed no gross changes in the red or white cell counts other than a leucocytosis and polymorphonuclear increase preceding death when toxic doses were employed. After repeated administration of therapeutic doses, the blood picture remained normal. In toxic doses, fatty degeneration of the liver and some cloudy swelling in the kidneys were produced. In therapeutic doses this harmful action was not observed.—D. G. Davey.

FULTON, J. D. (1943). **Studies in Chemotherapy. XXXIII.—Toxicity and Therapeutic Action of Certain Aromatic Diamidines after Exposure to Light.**—*Ann. trop. Med. Parasit.* **37.** 48–59. [For previous parts, see *V. B.* **13.** 143]. **2522**

Continuing his work on the increased toxicity of stale solutions of stilbamidine, F. now shows that light is the only active agent causing the change, and that the increase in toxicity is accompanied also by a marked reduction in therapeutic activity against *Trypanosoma rhodesiense* infections in mice. The monomethyl derivative of stilbamidine was affected by light in a similar way, but the dimethyl derivative, and pentamidine, and 4 : 4′diamidino diphenyl ethane were unaffected by light. It must be emphasized that the change in stilbamidine solutions is demonstrable after half-an-hour's exposure to winter sunlight, and appears to be complete within two days.—D. G. DAVEY.

JOSHUA, J. O. (1943). **A Note on the Use of Sulphaguanidine in Rabbits.**—*Vet. Rec.* **55.** 149. **2523**

Contrary to GOULD [*V. B.* **13.** 302.], J. considered that two methods of dosage of rabbits for coccidiosis might be used with safety (large doses given on two consecutive days only and very small doses given over a longer period). J. tried the former method on 50 rabbits at the rate of 0·5 g. per kg. body weight. Practically no defaecation occurred for 24–36 hours, but purgation was found unnecessary. Two or three such courses of treatment at ten-day intervals were tolerated, and well over the necessary 200 mg. % sulphaguanidine were present in the faeces 36 hours after dosage. J. claims that these results of dosage of the drug warrant investigation of its therapeutic use.

—C. V. WATKINS.

KNIPLING, E. F. (1942). **A Preliminary Report on a Treatment for Fleece-Worm Infestations in Sheep.**—*J. econ. Ent.* **35.** 896–898. **2524**

K. describes experiments carried out in Texas, U.S.A., on the control of sheep myiasis. Benzene containing approximately 15% of diphenylamine, diphenylene oxide, or *p*-nitrophenetole is an effective treatment for blowfly infestations on sheep. The mixture acts by killing the larvae and preventing reinfestation of the wound. Shearing away the wool over the infested area before treatment is advised. [Some workers have found it advisable to shear after, and not before, treatment in order to kill mature larvae present in the wool.]

—J. B. CRAGG.

SCHWARDT, H. H., & MATTHYSSE, J. G. (1943). **New Recommendations for Large Scale Control of the Sheep Tick in the Northeast.**—*J. econ. Ent.* **36.** 105–107. **2525**

The authors describe a portable dipping bath which is in common use in New York State, and trials with sulphur, rotenone-sulphur, and nicotine-sulphur dips. The formula of the rotenone-sulphur dip was :–cube (5% rotenone) 10 lb. ; wettable sulphur 100 lb. ; water 1,000 U.S. gal. (= 833 Imperial gal.). It is stated that one dipping with this mixture eradicated the ked, *Melophagus ovinus* [here erroneously referred to as a tick], and also *Trichodectes ovis*. The dip remained effective long enough to kill all young keds hatching from pupae which were in the fleece at the time of dipping.—J. B. CRAGG.

HILL, J. L. (1942). **Some Observations on the Stability of Lime-Sulphur During Dipping.**—*J. Coun. sci. industr. Res. Aust.* **15.** 207–210. **2526**

Observations were made during dipping for the control of the sheep mite, *Psorergates ovis*. A diluted lime-sulphur mixture was used, containing 1% polysulphide sulphur and 0·3% Agral 3 (a proprietary wetting agent). A flock of 10,000 sheep was dipped. Making up the dip with rain water caused an unexplained loss of approximately 8% in strength. The polysulphide concentration decreased progressively as dipping proceeded, and was not correlated with the number of animals passing through the dip. It is suggested that some of this decrease is caused by the return to the dipping bath of the draining liquors, since in the draining pens the dip is intimately exposed to the air.—H. McL. GORDON.

BRITTON, J. W., MILLER, R. F., & CAMERON, H. S. (1942). **The Control of Parasitism in Sheep with Phenothiazine in a Salt Lick.**—*Cornell Vet.* **32.** 400–406. **2527**

Following HABERMANN & SHORB's [*V. B.* **12.** 555.] demonstration that sheep could be induced to eat sufficient of a salt-phenothiazine mixture to cause inhibition of the development of nematode larvae in the faeces, the present authors tried this method for the control of nematodes in sheep, mainly *Ostertagia* and *Trichostrongylus*, under field conditions. Their experimental material consisted of lambs being fattened for market on Ladino clover pastures known to be contaminated with nematode larvae. Phenothiazine was mixed with half-ground salt in the proportion of 1 : 15 and placed in troughs on the pastures. The average daily consumption of this mixture for each lamb seems to have been about 4–8 g. Rather more than 1,000 animals were involved in the trials, and on the whole the effect of the treatment was satisfactory. It is not easy to state the results explicitly [the authors themselves point out that the work was not adequately controlled] but it appears that :– (a) within about 3–4 weeks of the sheep being put on the phenothiazine-salt mixture, larvae could not be cultured from the faeces, and even the eggs sometimes disappeared ; (b) there was an all-round general improvement in condition of the animals, and (c) the necessity for dosing them with a copper sulphate + nicotine sulphate mixture, a customary procedure on these particular pastures, was removed. The most important feature of these results is that daily consumption of what was probably not more than ½ g. phenothiazine to a total of about 14 g. (half the advised single therapeutic dose) had a good anthelmintic effect, as judged by the reduction of eggs in the faeces and the improved condition of the treated animals. The authors suggest that when phenothiazine is administered in small doses there is little if any absorption of the drug (the urine of the treated animals was not coloured red as is usual after dosing with phenothiazine), and that this may explain why repeated small doses have an anthelmintic effect. [If this explanation proves to be correct it will be an extraordinarily interesting fact.]

—D. G. DAVEY.

KAUZAL, G. P. (1941). **The Efficiency of Phenothiazine Against *Nematodirus* spp. in Sheep.**—*J. Coun. sci. industr. Res. Aust.* **14.** 301–303. **2528**

A single dose of phenothiazine at 0·6 g. per kg. body weight was highly effective against adult *Nematodirus* spp. in sheep.—H. McL. GORDON.

EVELETH, D. F., EVELETH, M. W., & GIFFORD, R. (1943). **Preliminary Studies on the Use of Phenothiazine in the Control of Lung Worms in Sheep and Goat.**—*Vet. Med.* **38.** 63–66. **2529**

A mixture consisting of 20 g. unconditioned phenothiazine suspended in 100 ml. of a mixture of equal parts of alcohol and glycerol was given as an intratracheal injection in an attempt to control lungworms in sheep and goats. The doses used varied between 2 ml. for lambs and 12 ml. for a full-grown sheep. It appears that the mixture killed at least some of the

worms present in the respiratory system, but too few experiments were done for definite claims to be made regarding the efficacy of the treatment.

[Control experiments to determine what results would have been obtained by the use of the alcohol-glycerol mixture without phenothiazine do not seem to have been made.]—D. G. DAVEY.

HABERMANN, R. T. (1943). **The Effect of Phenothiazine on Pregnant Goats and their Offspring.**—*Vet. Med.* **38.** 96–99. 2530

Seven pregnant goats were given phenothiazine in daily doses of 15–35 g. either in capsule form or mixed with grain, and the treatment continued for several days so that each goat received from 50–80 g. of the drug. Treatment continued in some cases until 13 days before parturition, but in no instance could untoward effects be detected either in the doe or the offspring. In three other goats treatment was continued after parturition, and although derivatives of phenothiazine were visibly excreted in the milk, neither does nor kids appeared harmed in any way.—D. G. DAVEY.

GORDON, H. McL., MONTGOMERY, I. W., & WHITTEN, L. K. (1942). **The Treatment of Outbreaks of Haemonchosis.**—*J. Coun. sci. industr. Res. Aust.* **15.** 200–206. 2531

Treatment of haemonchosis under outbreak conditions was studied, and the special problems encountered are discussed. The shortcomings of carbon tetrachloride and copper sulphate + nicotine sulphate mixture were demonstrated. The remarkable efficiency of phenothiazine under outbreak conditions is an extremely valuable addition to the many other virtues of this anthelmintic. With drugs other than phenothiazine, successful control of haemonchosis under these conditions requires repeated treatments. Anthelmintics which depend for their efficiency upon the action of copper sulphate in bringing about direct passage into the abomasum should be alternated with carbon tetrachloride which is efficient whether swallowed into the rumen or into the abomasum. About 100 sheep were used and changes in egg counts over a period of five months, during which two experimental treatments were carried out, are recorded graphically.—H. McL. G.

*BÜHNER, F. (1942). Untersuchungen über die Veränderung des Artenverhältnisses der Pferdestrongyliden I. nach Perequid-, II. nach Noemin-Gaben. **[Changes in the Relative Proportions of Species of Strongyles of Horses Treated with (1) "Perequid" and (2) "Noemin"].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 452]. 2532

Tests were made on ten horses and the following results obtained :– "perequid" tablets primarily acted on *Trichonema* spp., the large strongylid species being only slightly affected by it; "noemin" had no obvious action on horse strongyles.—J. B. CRAGG.

*WAHL, F. (1940). Untersuchung des Desinfektionsmittels "Viscojod" an Pferdespulwurmeiern. **[Action of "Viscojod" on the Eggs of *Parascaris equorum*].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **142.** 471]. 2533

W. found that a 1% solution of "viscojod" prevented development when the eggs were isolated from faeces, but a 10% solution was necessary when the eggs were mixed with faeces and straw. Treatment of stables with a 10% solution would be very expensive, so W. advises the use of a 2% solution after the stables have been cleaned. Since the solution loses its action when left to stand in air, he recommends that it should be freshly prepared.—H. D. CROFTON.

I. WHITLOCK, J. H. (1943). **Characteristics of the Population Available for Bioassay of Anthelmintics in *Nippostrongylus muris* Infection in Albino Rats.**—*J. Parasit.* **29.** 42–47. 2534

II. WHITLOCK, J. H., & BLISS, C. I. (1943). **A Bioassay Technique for Anthelmintics.**—*Ibid.* 48–58. 2535

I. A standard technique is described for inoculating rats subcutaneously with uniform doses of infective larvae of *N. muris*. The error of the sampling method used for counting the larvae was determined statistically, and found to be within workable limits. Variation in the numbers of worms establishing themselves (determined by counts of the gut contents ten days after inoculation) was of two kinds, *viz*, a small variation within each group of ten rats, approximating to the normal curve of variation, and a large variation between the 11 groups of rats, which was unpredictable statistically.

II. A bioassay technique for anthelmintics is described, depending on the mortality of *N. muris* in rats following graded doses of carbon tetrachloride. The mortality of the parasite was estimated from the numbers surviving in the treated animals and in parallel untreated controls. This procedure was justified by the results obtained in I, where the variation in numbers of worms establishing themselves was found to be small, within each group of rats.

A long statistical discussion is given of the results obtained when carbon tetrachloride was used as the test drug.—D. G. GILMOUR.

—. (1942). **Suggestions for the Conservation of Supplies for Worm Drenches.**—*Aust. vet. J.* **18.** 91–92. 2536

An Information Circular of the Division of Animal Health and Nutrition of the Council for Scientific and Industrial Research gives suggestions for conserving supplies of anthelmintics likely to be in short supply.

Carbon tetrachloride should be reserved for treatment of fascioliasis. Copper sulphate + nicotine sulphate mixture should not be used haphazardly for general treatment of "worms", but with tetrachlorethylene should be reserved for control of trichostrongylosis. Copper sulphate + sodium arsenite mixture should be used in haemonchosis. The enema treatment should be used for control of oesophagostomiasis. Phenothiazine should be reserved for severe outbreaks of trichostrongylosis and oesophagostomiasis.—H. McL. G.

EICHHOLTZ, F. (1942). Zur Chemotherapie der Eingeweidewürmer. **[Chemotherapy of Intestinal Helminth Infestations].**—*Hoppe-Seyl. Z.* **274.** 96–103. 2537

E. discusses in general terms the different types of parasites which infest man, and the various factors affecting the efficacy of treatment.

In attempting the isolation of the active principle from known anthelmintics, tests were made *in vitro* on isolated intestinal worms or even on earthworms or goldfish, if the crude drug was known to act on these. This was a useful method although sometimes there were difficulties, *e.g.* a soluble derivative of male fern was very effective *in vitro* while a relatively insoluble fraction was ineffective; in animal tests, however, the position was reversed. Many anthelmintics were relatively insoluble and the size of particle in such cases was of great importance; anthelmintic effect both *in vitro* and *in vivo* varied greatly when coarse or fine suspensions were used. The *in vivo* test was invaluable for making preliminary tests of anthelmintics suspended in different media. The *in vitro* test could not, however, be used with confidence in testing new anthelmintics.

Thus E. quotes figures showing that tridecyl resorcinol, which *in vitro* is ineffective, exhibited a noteworthy anthelmintic effect *in vivo*. Hexylresorcinol, on the other hand, which *in vitro* appeared the most potent of the series, was a less effective anthelmintic than the higher homologue. Failure of a new drug in an *in vitro* test should not, therefore, exclude it from therapeutic test.—H. E. HARBOUR.

HERRIOTT, H. W. (1943). **Prevention and Treatment of Infectious Calf Scours with 'Sulfasuxidine' Succinylsulfathiazole.**—*J. Amer. vet. med. Ass.* **102.** 261–263. **2538**

H. describes the varying incidence and virulence of infectious calf scours in four herds treated with sulfasuxidine (succinylsulphathiazole).

Treatment was necessary within six hours of birth in peracute cases. Dosage was at the rate of 1 g. per kg. body weight daily, divided into four equal doses and given with 1 drachm of sodium bicarbonate in a pint of warm water. The results in general in all four herds are stated to be promising, but no bacteriological or toxicological data are presented. The calves did not become as unthrifty as those treated with other remedies. —C. V. WATKINS.

BUTSCH, W. L., & STEWART, J. D. (1942). **Clinical Experiences with Dicoumarin 3,3'-Methylene-Bis-(4-Hydroxycoumarin).**—*J. Amer. med. Ass.* **120.** 1025–1026. **2539**

A report is given of the response of 150 patients to the administration of dicoumarin as a prophylactic measure against postoperative thromboses and embolism. The suggested basic dose is 300 mg. on two successive days and its effect should be maintained for at least four weeks. Dicoumarin should be used with caution or not at all in cases in which there are ulcerating lesions. —R. ALLCROFT.

LETONOFF, T. V., & KETY, S. S. (1943). **The Effect of Sodium Citrate Administration on Excretion of Lead in Urine and Feces.**—*J. Pharmacol.* **77.** 151–153. **2540**

Patients suffering from chronic lead poisoning were given sodium citrate by the mouth. A marked reduction in lead concentration in the blood and increase in urinary and faecal excretion of lead resulted.—R. McA.

GARCIA, M. E. (1942). Utilización de la Vitamina C en la terapía reproductiva de los bovinos. **[Vitamin C Therapy in Breeding Cattle].**—*Bol. tec. Direcc. gen. Agric. Ganad., B. Aires.* Secc. ganad. No. 7. 455–463. **2541**

A short account of the properties of ascorbic acid, and a review of the work of PHILLIPS *et al.* on its use in treating sterility in cattle [see *V. B.* **11.** 560].—J. G. C.

CLARK, A. M., COLEBROOK, L., GIBSON, T., THOMSON, M. L., & FOSTER, A. (1943). **Penicillin and Propamidine in Burns. Elimination of Haemolytic Streptococci and Staphylococci.**—*Lancet.* **244.** 605–609. **2542**

Penicillin in the form of a lanette wax + cod liver oil cream (120 units per g.) was applied to 54 infected burns and scalds in various stages of healing. In 41 of the wounds (76%), the haemolytic streptococci disappeared within five days and did not reappear. In seven instances the strains which promptly disappeared were insensitive to sulphonamide. There were no cases in which the application of penicillin appeared to have no effect. Staphylococci also disappeared quickly from many of the wounds. Healing was usually rapid and no toxic effects were observed.

Propamidine was applied in the form of a 0·1% cream in a Mumford base (lanette wax, hard paraffin, and technical white oil) to 34 similar burns. Haemolytic streptococci disappeared within five days from 21 of the wounds (62%). In eight cases, however, they persisted during treatment with propamidine. Of these, three lost their streptococci promptly when they were later treated with penicillin. Propamidine appeared to have less influence on the staphylococci than penicillin. Healing was very good in many of these cases, and in others not quite so rapid as with penicillin. No toxic effects were observed. Coliform bacilli, *Proteus vulgaris* and *Pseudomonas pyocyanea*, when present in the wounds, were apparently not affected by either of these agents.—J. M. ROBSON.

RUSSELL, D. S., & FALCONER, M. A. (1943). **Acridine Antiseptics. Further Experiments on their Local Action.**—*Lancet.* **244.** 580–581. **2543**

5-aminoacridine hydrochloride causes no appreciable damage to the brain, when applied as a 0·1% solution. In its action upon tissues it closely resembles proflavine sulphate and 2 : 7-diaminoacridine. When applied in the form of a powder, all these compounds are highly destructive to the brain, muscle, and other soft tissues. It is suggested that these powders should not be used in the prophylactic treatment of fresh wounds.—J. M. ROBSON.

See also absts. **2494** (sulphaguanidine), **2493** (action of salicylates), **2332** (action of drugs on tubercle bacilli), **2496**, **2497**, **2502** (insecticides), **2495**, **2498**, **2499** (anthelmintics), **2467** (wound healing).

HYGIENE AND PUBLIC HEALTH

DERRICK, J. D., & KESTER, W. O. (1942). **The Dairy Industry and Army Veterinary Inspection in Hawaii.** —*Army vet. Bull., Wash.* **36.** 173–198. **2544**

There are approximately 9,500 dairy cattle in 115 herds in the Territory of Hawaii. Between 600 and 1,000 dairy cattle are imported annually from the U.S.A.; they are required to pass tests for TB. and brucellosis before shipment, and after arrival in Hawaii they are submitted to quarantine and further tests. Disease control is directed by the territorial veterinarian, with one assistant veterinarian on each of the islands. TB. reactors in the Territory during the period 1936–39 were 0·336%; brucellosis reactors for the same period were 3·98%. Approximately 75% of the milk sold by dairies in 1940 was pasteurized. Details are given regarding total milk production and the average yield per cow. Information is given regarding the feeding of dairy cattle in Hawaii, together with an account of experiments on the utilization of local crops and by-products, *e.g.* pineapple bran, cane molasses, etc. Public health regulations pertaining to dairy industry in Hawaii are, in general, similar to the U.S. Public Health Regulations. Full details are given of the methods of inspection applied to dairy farms and milk plants.—N. J. SCORGIE.

DE FIGUEIRÔA RÊGO, A. (1940). A produção e a higiene do leite alimentar. **[Production and Hygiene of Milk].**—*Bol. pec., Lisboa.* **8.** No. 1. 3–41. [French summary]. **2545**

The author criticizes the present state of the milk industry in Portugal and calls for a campaign in favour of clean milk production. Among other suggestions he asks for co-operative organization of production and technical aid for the production of clean milk. He considers pasteurization as a necessity and that it should

be carried out under rigorous State control. He proposes the establishment of various departments for control and educational purposes and stresses the economic value of hygienic production methods.—M. WATSON.

FALCIONI, A. C. (1942). Algunas observaciones sobre el control sanitario de las usinas pasteurizadoras de leche. **[Control of Milk Pasteurizing Plants].**—*Rev. Med. vet., B. Aires.* **24.** 216–224. **2546**

F. points out the dangers of the present system of uncontrolled pasteurizing plants and suggests the establishment of uniform State control. Each pasteurizing plant should have a laboratory under the supervision of a competent bacteriologist, working according to a standardized procedure laid down by a central State laboratory. The control of the industry should be in the hands of veterinary officials.—MILLER WATSON.

ANTHONY, D. J. (1943). **The State of Meat Inspection in Britain at War.**—*J. R. sanit. Inst.* **63.** 75–79. **2547**

In a Benjamin Ward Richardson lecture, A. described the inadequate meat-inspection conditions in England at the present time, and emphasized that the organization of the inspection is unsatisfactory, due to the fact that there is no unified meat-inspection service in the country, and that inspection of meat is carried out by local authorities, without liaison with the Ministry of Food nor with other authorities.—J. E.

BREGANTE, L. J. (1942). Acción del frío (criolisis) en carnes de bovino. Posibilidad de su interpretación por algunos procedimientos físicos. **[Action of Cold on Beef].**—*An. Fac. Vet., Montevideo.* **4.** 135–151. [English summary]. **2548**

B. studied the action of prolonged freezing on beef by comparing the surface tension, viscosity, and freezing point of expressed juice of frozen meat with that from fresh meat. He found that prolonged freezing produced a gradual decrease in surface tension, decreased viscosity, and lowered freezing point. He concludes that freezing produces changes in molecular structure, but finds no evidence to support MASIMOV'S (1912) " ice-needle " theory.—MILLER WATSON.

See also absts. **2394** (meat storage), **2413**, **2415** (meat inspection).

TECHNIQUE AND APPARATUS

HAYWARD, N. J., & MILES, A. A. (1943). **Iron Media for Cultivation of Anaerobic Bacteria in Air.**—*Lancet.* **244.** 645–646. **2549**

The introduction of a small strip of sheet iron into tubes of peptone water medium enables even the fastidious anaerobes to grow in the ordinary incubator without requiring the use of an anaerobe jar. The tubes of peptone water, sugars, milk, etc., should be boiled for a few minutes, then cooled and the already sterilized strip of iron added just before inoculation. The growth-promoting capacity of iron-peptone medium was proved satisfactory for both sporing and nonsporing anaerobic bacilli and for anaerobic streptococci. The fermentation reactions of a selection of organisms developed within two days and were found to be correct. The early formation of a precipitate masks actual growth, therefore acid-production should be determined by mixing a loopful of culture with a drop of brom-thymol blue on a white plate.—J. KEPPIE.

KAESS, G. (1942). Kulturschalen zur Fortzüchtung und Keimzahlbestimmung von anaeroben Bakterien. **[Modified Petri Plates for Anaerobic Culture].**—*Zbl. Bakt. II.* **105.** 32–38. **2550**

K.'s apparatus consists of a glass disc and a lid like a Petri dish in form and size but only 3 mm. high inside. Disk and lid are ground at their peripheral point of contact so as to give a gas-tight joint with a wax bond, except for a 15 mm.-wide gap in the lid which serves as the filling orifice. After assembly, the inoculated culture medium is poured in until four-fifths of the cavity is full, allowed to set, and then 0·5% glucose agar is added to form a seal over the medium. Finally the orifice is waxed over.

This method is said to have given excellent results in anaerobe culture. The method is simple, and economical in use of materials. Colonies can very easily be seen and counted in the thin culture.—J. E.

WHITLOCK, H. V. (1941). **A New Apparatus for Counting Small Numbers of Nematode Eggs in Faeces.**—*J. Coun. sci. industr. Res. Aust.* **14.** 306–307. **2551**

W. describes an apparatus which permits the accurate estimate of as few as six nematode eggs per gramme of faeces. It consists of a small flotation chamber with a sliding top which, after sufficient time has elapsed to allow the eggs to collect on its under-surface, can be drawn aside for observation.

—H. McL. GORDON.

ANGULO, J. J. (1942). Una solución al problema de la termolabilidad de los azúcares para pruebas de fermentación en microbiologia. **[Solution to the Problem of Sterilizing Sugars Used in Fermentation Tests in Microbiology].**—*Rev. Med. trop. parasit., Habana.* **8.** 64–67. [English summary]. **2552**

For carbohydrate solutions which are liable to become hydrolysed by the action of heat, *i.e.* disaccharides and polysaccharides, A. describes sterilization by filtration through a Seitz EK filter into a container in an evacuated desiccator.—ISOBEL W. BURTON.

GHOSH, L. M., & MAPLESTONE, P. A. (1941). **An Improved Method of Growing Pure Culture of Ringworm Fungi.**—*Indian J. med. Res.* **29.** 691–692. **2553**

Since the skin is heavily contaminated with pyogenic cocci and other bacteria, there is great difficulty, especially in the tropics, in obtaining pure cultures of ringworm fungi. Various methods were tried to obviate this difficulty such as (a) inoculating the primary culture on dry media, (b) drying the scales of skin in an incubator, and (c) washing the scales in alcohol and then ether before sowing on the medium. None of these methods was satisfactory, so the use of dyes was tried. Some 200 separate cultures were put up on Sabouraud's medium (with glucose instead of maltose) containing various concentrations of gentian violet (Merck B) in distilled water. It was found that 0·25 ml. of 0·1% solution of gentian violet added to 100 ml. Sabouraud's medium, after the latter had been sterilized and before it had solidified, gave good growth of fungi with complete inhibition of other bacteria. The infected scales of skin or nails were first washed (5 min.) in alcohol, cut in very small pieces, again washed in alcohol and placed on the surface of the medium.

—BALWANT SINGH.

KAUZAL, G. P., & GORDON, H. McL. (1941). **A Useful Mixing Apparatus for the Preparation of Suspensions of Faeces for Helminthological Examinations.**—*J. Coun. sci. industr. Res. Aust.* **14.** 304–305. **2554**

An electric hand-drill fitted with mixing blades on a spindle is used in the preparation of faecal suspensions for making egg counts. The same apparatus is also used for preparing faecal cultures.—H. McL. GORDON.

See also absts. **2330** (culture of tubercle bacilli), **2342** (of *Br. abortus*), **2355** (preservation of malaria parasites), **2373** (of distemper virus), **2368**, **2375** (ultracentrifugation of viruses), **2534**, **2535** (bio-assay of anthelmintics), **2354** (direct observation of circulating blood), **2381** (micromethod for study of phagocytosis), **2350** (determination of bacterial constituents attractive to leucocytes).

MISCELLANEOUS

*Bressou, C. (1941). L'enseignement vétérinaire en Europe. **[Veterinary Education in Europe].** Paris: Vigot Frères. [Abst. from review in *Berl. Münch. tierärztl. Wschr.* June 26th. 203. (1942)]. **2555**

This is said to be a digest of replies to a questionnaire sent by B. before the war to all European veterinary schools. It contains facts and figures about the schools, students and teachers.

Asdell, S. A., & Marquardt, J. C. (1941). **The Dairy Goat.**—*Ext. Bull. Cornell agric. Exp. Sta.* No. 414. pp. 39. [Revised]. **2556**

An account of goat husbandry written for the beginner. Some of the commoner diseases of the goat are briefly dealt with from the point of view of the layman.—N. J. Scorgie.

—. (1942). **Putrefaction in Cattle Hides. Results of Delayed Drying Trials in Nigeria and Kenya.**—*Bull. imp. Inst.* **40.** 103–121. **2557**

A detailed description of observations on two consignments of dried ox hides sent to England from east and west Africa. The hides were frame-dried 8, 16, 24, and 32 hours after flaying. It was found that putrefactive damage occurred to a greater or lesser degree in all the samples, so that it is recommended that an interval of not over two hours should elapse between flaying and setting out to dry.—J. E.

REPORTS

Cyprus. (1942). **Annual Report of the Director of Agriculture for the Year 1941.** pp. 4. Items of veterinary interest pp. 1, 2, 3 & 4. Nicosia: Govt. Printing Office. [fcp] [3 piastres]. **2558**

Unfavourable climatic conditions led to grave shortage of pastures and all sheep flocks became debilitated and a ready prey to parasites. There was abortion, with heavy mortality in goats. Shortage of feeding stuffs caused loss of condition of equine animals and cattle. Apart from parasitic disease and two small outbreaks of Anthrax in goats there was no serious epizootic or enzootic during the year. Nearly 650,000 animals were vaccinated against Anthrax.

War conditions caused a diminution of both exports and imports of livestock products, but export of animals (especially pack animals) showed an increase.

The third annual inspection in the Warble Fly campaign showed that the highest proportion of affected animals was 5·4 compared with 32·8% and 78·4% in 1940 and 1939 respectively. In December 1941 only 0·1% of cattle were affected.

Copper sulphate + nicotine sulphate mixture was issued to flock owners for treatment of Stomach Worm Infestation. Treatment of Liver Fluke Disease by intrarumenal injection of carbon tetrachloride was continued. Louse Infestation of sheep and goats was effectively dealt with by dipping in a sulphur preparation.

The veterinary laboratory prepared over 700,000 doses of single spore Anthrax vaccine and 600 doses of Fowl-Pox vaccine. War conditions restricted research but the survey of parasites of domestic and wild animals was continued.—H. E. Harbour.

Poland. (1939). Sprawozdanie z kliniki chorób wewnetrznych i zaraźliwych akademii medycyny weterynaryjnej we Lwowie. **[Report of the Clinic, Veterinary College, Lwow].** [Markowski, Z.]—*Przegl. wet.* **54.** 145–172. **2559**

The most common disease in 1938 was Strangles with pharyngitis without abscess formation; rivanol in a solution of glucose was used intravenously for treatment. Other infectious diseases treated in the Clinic were Anthrax, Tetanus, Equine Influenza, and one atypical case of Rabies in a horse, diagnosis being confirmed by the rabbit inoculation test. It is stated that *Bact. coli* infection in calves was successfully treated with "colistol". Todorit was successfully used against bovine Piroplasmosis. In small animals the following diseases were reported:—Tuberculosis, Paratyphoid Infections, Stuttgart Disease, Distemper, Rabies. and Feline Infectious Nasal Catarrh; 5,470 small animals were treated in the clinic. Apart from infectious diseases many non-infectious and parasitic diseases were also treated. The Clinic of Veterinary Medicine had a laboratory for diagnosis of freshwater fish diseases.

—M. S.

See also abst. **2413** (New York State Trichinosis Commission).

BOOK REVIEW

Miller, W. C. [M.R.C.V.S., F.R.S.E., Courtauld Professor of Animal Husbandry, Royal Veterinary College, London], & Robertson, E. D. S. [M.R.C.V.S., Lecturer on Animal Management, Royal (Dick) Veterinary College]. (1943). **Practical Animal Husbandry.** pp. viii + 496. 218 figs. 4 appendixes. Edinburgh & London: Oliver & Boyd Ltd. [3rd Edit.] [8vo] [20s.] **2560**

The value of this useful book has been further enhanced in this the third edition by general detailed improvements and by new sections on matters not dealt with before, notably on the description and identification of individual horses and cattle and by the inclusion as appendixes of certain enactments on animal management etc. relating to horses, and of tables giving numerical data on reproductory functions of the various domestic animals.

Incidentally, the section on identification of animals would be improved by the inclusion of animals other than horses and cattle and by consideration of other methods than those described.

It may be recalled here that the book originally grew out of a lecture and demonstration course in animal management at the Edinburgh Veterinary College. It was designed to teach the student everything about the handling and management of domestic animals. There are chapters on manipulation and restraint, examination for soundness, administration of medicines, stable vices of horses, grooming and stable care generally, management of particular classes of horses, saddlery and harness, shoeing, and general management of farm animals other than horses, including poultry, rabbits and fur animals—to mention the main features only. No other book is known to cover the same ground.

This repository of information and instruction is to be highly recommended to veterinarians and others who have charge of domestic animals.—J. E.

See also absts. **2447-2451** (minor elements), **2458** (vitamins), **2470** (physiology).

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